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THE RECREATION FUNCTION OF BEAUMARIS STORMWATER LAKE

by

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A THESIS
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Date April 17 1984

DEDICATION

To Lorraine, whose patience and support made the completion of this thesis possible.

ABSTRACT

There is currently a trend in Western Canada towards the construction of stormwater lakes in new urban developments. This trend is primarily based on the fact that the lakes offer substantial capital cost savings over the more traditional urban drainage systems. Also contributing to the trend is the assumption that these lakes offer secondary benefits resulting from improved aesthetics and recreation opportunities within the community. The accuracey of this assumption has, however, remained unsupported, as few objective evaluations have occurred.

This study attempted to examine the recreation function and satisfaction derived from stormwater lakes using Beaumaris Lake in Edmonton, Alberta as a case example. The residents living in the Beaumaris Neighbourhood were identified as being the best judges of this recreation function. These residents were asked to complete a self administered questionnaire designed to identify: their original expectations regarding Beaumaris Lake; their actual recreation participation at the Beaumaris Lake site; their attitudes towards the physical, biological, social and managerial components of the lake setting; their satisfaction with the lake; and finally their pertinent socio-demographic characteristics.

The main findings of the study revealed that, in general, the original expectations of the Beaumaris Lake residents were matched by their actual recreation participation at the lake site. The study also identified water quality as one of the major limitations of Beaumaris Lake as a recreation setting. Nevertheless, the majority of respondents indicated that they were satisfied with the recreation opportunities provided by the Beaumaris Lake setting.

On the basis of the study findings it is concluded that stormwater lakes, as represented by Beaumaris Lake, can be successful in fulfilling a recreation function. It is also concluded that the current trend toward the development of urban stormwater lakes in the urban setting may play an important role in providing richness and variety within the urban environment.

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I. THE PROBLEM AND ITS SETTING

A. Introduction

The nature of the urban environment has a major impact on the quality of life of its residents. Lately, there has been a growing concern that this impact has become a predominantly negative influence (French 1978). Higbee (1969:192) suggests that the problem lies in the fact that:

> . . . To live compactly in cities is not normal to the human body or its nervous system. Neither evolved in an urban environment. The physical and psychological stress brought about by living in the city can be tolerated only by those in good health and sanity. The synthetic urban environment is itself a cultural artifact and therefore can only be good if it is deliberately well designed and managed.

An important component of this design and management involves the provision of open space and related amenities in the urban environment. The neighbourhood setting is of particular importance simply because of its proximity to the homes of residents (Glyptis and Chambers 1982). Research done in the mid-seventies found that ". . . As much as two-thirds of all free time is spent within the home and its immediate environment" (Burton 1976:19). One of the primary reasons for the popularity of the local neighbourhood as a recreation site is the low cost of travel involved in visiting the area (Young and Flowers 1982). The local neighbourhood is a convenient and therefore important recreation setting.

Although the importance of the local environment as a location for open space and related amenities is generally recognized, a shortage of these features has been perceived. The United States, National Urban Recreation Study (1978:34) identified the largest recreation deficiencies in ". . . close-to-home parks and facilities that are easily accessible and usable on a day-to-day basis" An increase in the supply of neighbourhood open space would appear to be one method of improving the quality of life of urban residents.

The obvious solution in developing areas is for the city to create more park land. However, whether this park acquisition is accomplished through a municipal purchase of private property or through increased recreational reserve requirements, problems arise at a certain point due to economic costs. Although the need for new housing development may be demonstrated, the cost of incorporating extra open space in the form of parks may be prohibitive.

The current trend in Alberta toward urban stormwater lakes appears to offer a more attractive solution to the problem of providing a greater amount of neighbourhood open space. Stormwater lakes are currently being incorporated into the design of new residential developments in Alberta primarily due to their utility function in managing stormwater. Basically, the lakes are felt to offer substantial capital construction savings over the traditional conduit system of stormwater management (Alberta Environment 1976, Chambers and Tottle 1978; Fekner 1978; Gill and Kelly 1978; Mulamoottil 1979).

In addition to the stormwater management function of these lakes, recreation and aesthetic functions have also been suggested (Calgary 1981; Edmonton, 1980; Fort McMurray 1982; Chambers and Tottle, 1978; Fekner 1978; Gill and Kelly 1978; Marsalek, Weatherbe and Zukovs 1982; Mulamoottil 1979). These recreation and aesthetic functions have been anticipated due to the lakes' open space and water characteristics. If these secondary functions of recreation and aesthetics prove true, stormwater lakes may provide a partial answer to the problem of a shortage of usable open space in residential neighbourhoods.

The general objective of this study is to evaluate the stormwater lake concept in terms of its recreation and aesthetic functions. Underlying this purpose is the question of whether urban stormwater lakes have a positive effect on the quality of the urban environment.

B. Statement of the Problem and the Subproblems

The purpose of this research is to examine the recreation function and satisfaction derived from stormwater lakes using Beaumaris Lake of Edmonton, Alberta, as a case example. This examination will be facilitated by comparing the recreation opportunities initially anticipated by Beaumaris neighbourhood households, as influenced by the city government and the developer, with those recreation opportunities presently recognized by these same households.[1]

To facilitate the examination of this main problem, the following subproblems will be addressed:

---

[1] Definitions of key terms used in this statement and throughout the thesis text are provided in Appendix A.

1. To identify the city government's and the developer's intent for and incorporation of recreation opportunities into the design of Beaumaris Lake.
2. To identify the initially anticipated recreation opportunities of households in the Beaumaris neighbourhood.
3. To identify the recreation opportunities realized by households in the Beaumaris neighbourhood.
4. To compare the anticipated against the realized recreation opportunities of Beaumaris Lake in order to gain an indication of the level of resident satisfaction and to explore the reasons for that level of satisfaction.

C. Delimitations

The following delimitations to the study were made to ensure that this thesis remained within the operational constraints related to the time, funding and expertise that were available to the researcher. The first delimitation is that the study does not attempt to evaluate the primary utility (stormwater drainage) function of Beaumaris Lake. This delimitation was made in an attempt to maintain the focus of the study on the problem statement. The study of the utility function of the lake lies in the domain of hydrological engineers.

The second delimitation of the study is that, households represented in the study consist of occupied single detached, single attached, and duplex dwellings located within the boundaries of Beaumaris Road, Castle Downs Road and 153rd Avenue. See Figure 1.1 for clarification of the study area. Apartment blocks were not surveyed. It was felt that these boundaries effectively marked the limits of the community of Beaumaris as defined by major arterial roadways. Apartment blocks were not surveyed due to difficulties in delivering the questionnaires to individual households within the apartments.

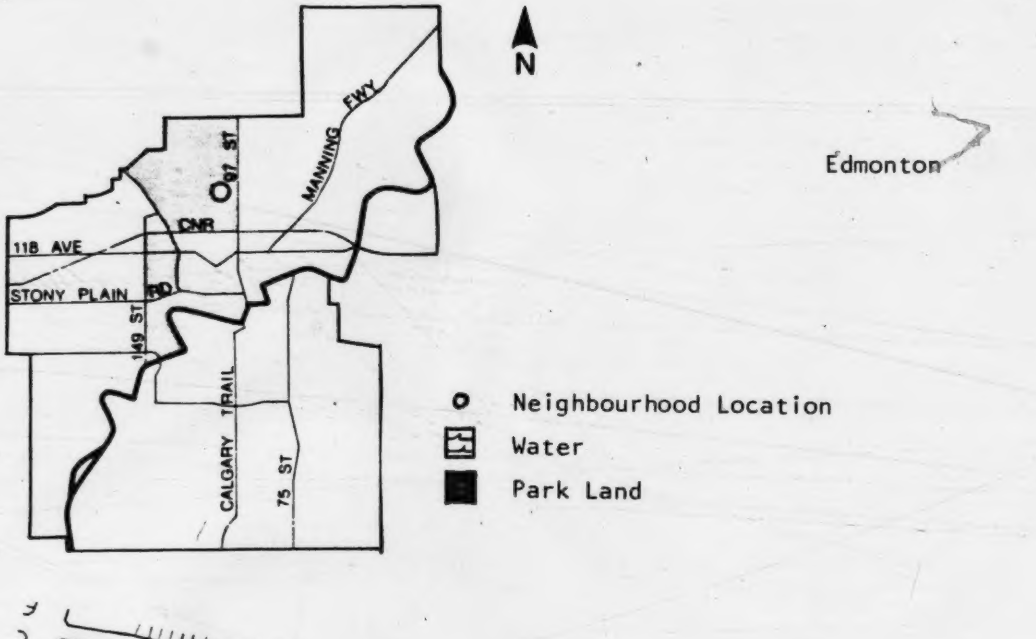
Finally the third delimitation is that non-resident lake users were not interviewed. This decision was made in recognition of the financial and time constraints of the study.

D. Limitations

Two main limitations to the study should be recognized from the outset. The first of these relates to the Beaumaris resident questionnaire. Kidder (1981) has pointed out that the reliability and validity of such instruments are never perfect. Since the primary instrument used in this study was relatively untested, it certainly falls within the bounds of

FIGURE 1.1

LOCATION OF STUDY AREA


N
MANNING FWY
97 ST
CNR
118 AVE
STONY PLAIN RD
149 ST
CALGARY TRAIL
75 ST
Edmonton
Neighbourhood Location
Water
Park Land
BEAUMARIS ROAD
CASTLE KEEP ROAD
153 AVE
Beamuaris
Neighbourhood

Edmonton Planning Department 1983a

Kidder's statement. The second limitation relates to the June data collection period of the self-completed questionnaire. Respondents' answers tend to reflect their perceptions at the time of the actual data collection which may be substantially different than at an alternate time of the year (Moss and Goldstein 1978). Respondents in this study were probably biased towards perceptions of the lake during spring and summer rather than winter or fall due to the timing of the survey.

E. Significance of the Problem

The recreation and aesthetic benefits of stormwater lakes have been promoted in Alberta as an integral part of stormwater lake development. This promotion is evident through developer and real estate advertising and through the content of municipal stormwater lake policy documents. Advertising material includes developer brochures which have stated that:

> The lake amenity offers the potential of summer activities including many forms of boating, jogging, family walks, biking, picnics and many other opportunities to enjoy your summer. The winter will offer skating, cross-country skiing, or, if you like, walking or sledding around the lake to witness the seasonal change in the landscape.
>
> Genstar Development Brochure (n.d.)

Rental housing units within the area are marketed in a similar way, extolling the recreational benefits of living near to Beaumaris Stormwater Lake (Edmonton Journal 1982).

The developer promotion of the recreation benefits relating to stormwater lakes appears to be paralleled by municipal policies concerning the lakes (Calgary 1981; Edmonton Parks and Recreation 1980; Fort McMurray 1982). These policies also identify a recreation and aesthetic function to be served by stormwater lakes.

Development decisions based on the assumption that stormwater lakes provide recreational and aesthetic benefits have direct impacts on other aspects of the community's development. One impact is that property near to artificial lakes often has a higher purchase price than equivalently sized property removed from the lake setting (David and Lord 1969; Baxter and Mulamoottil 1981). A second impact is that municipalities tend to allocate a portion of their municipal reserve land to park areas associated with stormwater lakes (Edmonton Regional Planning Commission 1980). The result is that less reserve land is available for parks in settings removed from the stormwater lake. A third impact of stormwater lakes is their physical presence in the urban landscape. There is an obvious safety hazard associated with the physical presence of an open water body in a residential neighbourhood. These impacts represent a portion of the cost of having a stormwater lake within a residential neighbourhood. At the present time an assumption is being made that at least a portion of these costs are being countered by recreational and aesthetic benefits resulting from the lakes.

Unfortunately, there is a dearth of existing research on stormwater lakes in general. The majority of research that does exist focuses primarily on the technical aspects of the lakes. This research has dealt with the hydrological and water quality aspects of the lakes (Chambers and Tottle 1978; Tottle 1979; Hodgson 1982; Field 1978).

Non-technical studies on stormwater lakes have been even rarer than the technical studies. These studies have focussed on the public perception of the lakes (Baxter and Mulamoottil 1981; Marsalek, Weatherbe and Zukovs 1982). It is through research in this area that the assumed recreation and aesthetic benefits will be verified or rejected. The present study falls into this category of public perception research.

This study recognizes the need to consider the consumer in recreation research and not simply the provider. The importance of researching the residents' perceptions of the recreation benefits of stormwater lakes is that the total costs versus benefits of constructing stormwater lakes will be more fully understood. At present a major portion of the benefits are simply assumed. The existing approach provides a weak basis for making important development decisions.

Overall this study will help planners and designers to better understand and thereby enable them to optimize the recreation and aesthetic benefits of stormwater lakes. In addition, this research provides more realistic expectations as to the impact of stormwater lakes on the quality of life of nearby residents.

F. Organization of the Thesis

For the purpose of describing this research, the thesis has been divided into eight chapters. Chapter I has dealt with the introduction to the study. Chapter II provides a review of the research and literature related to the study problem which is in turn followed by a description of the study research methodology used in Chapter III. Chapter IV provides a description of the Beaumaris Lake setting. All of these early chapters provide the context in which the study occurred. The analysis and interpretation of the data start in Chapter V with an examination of the original resident expectations for and actual use of Beaumaris Lake as a recreation setting. Chapters VI and VII extend this analysis by examining residential attitudes toward and resident satisfaction with Beaumaris Lake. Finally Chapter VIII provides a summary as well as noting the major implications and conclusions of the study.

II. REVIEW OF THE RELATED RESEARCH AND LITERATURE

The intent of this chapter is to provide a conceptual and theoretical basis for the study. The approach chosen to accomplish this purpose was first to review the physical component and then the behavioural aspects related to urban stormwater lakes. The chapter has therefore been divided into the following sections: A) Open space in the urban environment; B) Urban stormwater lakes; C) The behavioural approach to studying recreation; D) Factors related to satisfaction with stormwater lakes; and E) Summary and conclusions.

A. Open Space in the Urban Environment

Open space has been identified as being a positive factor in the determination of the quality of the urban environment (Berry 1976; Bradley 1975; Clawson 1969; Shoman 1970; Wright, Braithwait and Forster 1976). An understanding of the role of open space in the urban environment requires the recognition that this environment includes an experiential aspect as well as a physical aspect. It is how the physical aspect of the environment is experienced or perceived by its inhabitants that determines their sense of belonging within that environment (Relph 1976; Tuan 1977). The inhabitants' sense of belonging in turn helps determine their perception of the quality of that same environment. This section of the review will further examine the role of open space through a description of its development throughout history and a discussion of its role in today's cities.

Historic Background of Urban Open Space

Open space as a component of the urban fabric or townscape has changed substantially in both form and function throughout history (Burke 1976). A brief examination of the development of open space in Europe and North America from the Middle Ages to the present will serve as a basis for understanding open space in today's cities.

The medieval period of European History (5-14th Century) has commonly been referred to as the "Dark Ages" - a period of social and intellectual regression from the earlier more advanced Greek and Roman societies. Cities of this period were typically characterized by walled fortifications. Open space within these walls was limited to the local town square or town commons. In retrospect medieval urban open space was inward oriented. Medieval man seemed reluctant to give up his sense of security found by living in closed crowded spaces. As a reflection of this fear, urban open space was not a prevalent feature of this period (French 1978; Heckscher 1977; Newton 1971).

The following Renaissance period begining in approximately 1400, witnessed a shift towards the acceptance of a greater amount of open space within the city. This acceptance of urban open space paralleled man's reversal from introspective daydreaming to outward exploration. Increased open space was provided in the form of urban gardens which attempted to illustrate man's dominance over nature by using nature's materials in an unnatural, geometric way (French 1973).

Two major factors greatly affected urban open space in the 18th and 19th centuries. The first factor was the popular romanticism of nature in the literature of that period by men such as William Bartram (Laurie 1979). The second factor was the need to solve the problem of urban crowding brought about by the shift from a rural to an urban population that occurred along with the industrial revolution. Both factors led to a movement toward more open green spaces. The result of this combined movement in Victorian England and throughout Europe in general was an increase in the number of public urban parks (Chadwick 1966).

Equally as important as the provision of public parks was the development of contemporary urban planning. Ebenezer Howard's theory and publications on the Garden City concept served as a major step in the development of urban planning (Newton 1971, Laurie 1979). Howard's theory held that the town and country must be married - "Human society and the beauty of nature are meant to be enjoyed together" (Newton 1971:454). The idea of open space within the urban setting was central to the Garden City concept and has carried over to contemporary urban planning.

The industrial revolution brought similar problems to American cities as it had to their European equivalents. The American response to this deterioration of the urban setting was led by men such as Daniel H. Burnham and Frederick Law Olmsted. Burnham's contribution was in the origin of the City Beautiful movement which promoted a sense of wide-open space and of liberating vistae (Heckscher 1977:21). His concepts of open space were incorporated into the 1883 World Columbian Exposition in Chicago and had considerable impact on city planning in the latter part of the 19th century (French 1973, Heckscher 1977; Newton 1971).

Olmsted's contribution to urban open space was more specifically addressed towards urban parks. His most noteworthy achievement is generally recognized as his Greensward design for New York's Central Park in the 1850's. In Central Park, Olmsted created ". . . an area where urbanites could taste all the joys of rural life, including seclusion, without leaving the city" (Fabos *et al*. 1968:18). Olmsted's belief that nature and open space have an important role to play in urban areas continues to exert strong influence on today's cities (Sutton 1971).

A separate but related source of argument for urban open space originated in the early American playground movement which felt that space for active recreation was needed to combat social problems in urban areas. In response to this movement the provision for active and organized recreation has become a distinct feature of urban parks.

Both European and American attitudes have had a very strong influence on Canadian urban open space. British influences are evidenced through urban parks such as the Halifax Common which was granted to the public officers of the town of Halifax in 1763 by the Lieutenant Governor of Nova Scotia (McFarland 1970). This "common" followed the tradition of many English commons and evolved from a pasturage and military exercise ground into an urban park used for the enjoyment of the general public. Similarily, early American influence is exemplified by Mount Royal Park in Montreal, designed by Frederick Law Olmsted in 1877.

The feeling that urban man must continue to have some contact with his rural and natural heritage continues to pervade Canadian thought as a result of British and American influence. This belief in the importance of the natural setting to urban man has manifested itself in Canada in at least two ways. The first is through the provision of urban open space such as park land within easy reach of the majority of city dwellers. The second is through the tendency of urbanites to settle in the urban fringe ". . . in a landscape located somewhere between the opposing forces of artificiality and nature" (Bunce 1980:4). Although this idea of combining the city and country may have had its roots in Europe and the United States it is now firmly entrenched in Canada.

Current Role of Urban Open Space

Open space plays an important role in today's cities . The importance of this role can best be understood by examining how the term open space is defined, what some of the current functions of open space are, and finally the unique role that water plays in urban open space.

Open space has been defined in a variety of ways. These definitions can generally be placed on a continuum between those that are restrictive in nature and those that are inclusive in nature. The restrictive definitions of open space generally describe it as greenspace in or around cities including parks, golf courses, and wildlife sanctuaries (Bradley 1975; Burton, Ellis and Homenuck 1977; Shoman 1970). These green spaces are further limited in some instances to include only publicly owned land. The inclusive categories of open space are exemplified by Clawson's (1969:139) statement that urban open space includes:

> . . . all geographical area (land or water) within or reasonably adjacent to a city or urban concentration, which is not covered by buildings or other permanent structures.

Similar definitions have been noted by Burton, Ellis and Homenuck (1977), and Wright, Braithwaite and Forster (1976).

The differing definitions in and of themselves do not present a problem. However, difficulties arise from the fact that different segments of society tend to use different definitions of open space. Canadian studies have found that local citizens and local politicians tended to hold restrictive definitions of open space, while urban planners tended to use the more inclusive definition of open space (Burton, Ellis and Homenuck 1977; Ellis and Homenuck 1979). These differences in interpretation may lead to substantial differences in the perception of the quantity and quality of urban open space in a city. In an attempt to avoid these problems in this study, it should be recognized that the inclusive interpretation of open space has been used . It is clear that stormwater lakes fall within the bounds of urban open space when this space is defined as:

> All urban land and water, both publicly and privately owned, that is open to the sky and reasonably accessible to freely-chosen activity or visual exploration, and that serves man and nature in an educative, aesthetic, productive, protective, or recreative way.
>
> Wright, Braithwaite and Forster 1976:7.

Given the inclusive definition of open space to be used in this study, the fact that open space may serve a variety of functions must be recognized. The following functions will be briefly examined: 1) ecological, 2) utility, 3) safety, 4) city forming, 5) aesthetics and 6) recreation.

The ecological function of urban space has been frequently identified in the literature (Berry 1976; Clawson 1969; Shoman 1970; Wright, Braithwaite and Forster 1976). This function is primarily based on the argument that greenspace or parks are the "lungs of the city". The ecological function of open space is an attempt to maintain or improve the ecological environment of the city.

A second function of open space often identified in the literature may be termed utility (Berry 1976; Bradley 1975; Shafer and Moeller 1979; Wright, Braithwaite and Forster 1976). This utility function usually refers to the open space associated with public utilities such as power lines.

Safety is a third function of open space (Badley 1976; Wright, Braithwaite and Forster 1976). Examples of open space used for this function include flood plains, unstable slopes, airport flight path zones and fire zones. This type of open space avoids safety risks which would be present if the areas had been developed for residential land use.

A fourth major function of urban open space is its use as a city forming device (Clawson 1969; Wright, Braithwaite and Forster 1976). The intent of this function is to promote community identification. This function helps to avoid the problems of "placelessness" or lack of community identity (Relph 1976, 1981).

Aesthetics represent a fifth major open space function (Berry 1976; Clawson 1969; Shafer and Moeller 1979; Shoman 1970; Wright, Braithwaite and Forster 1976). The idea of this function is to provide pleasant views of the urban scene. These views are often provided by contrasting the open and closed aspects of the city or contrasting natural settings against man-made settings.

Recreation is a sixth function of urban open space (Berry 1976; Bradley 1975; Clawson 1969; Shafer and Moeller 1979; Shoman 1970; Wright, Braithwaite and Forster 1976). This function is commonly regarded as the chief purpose or at least one of the primary functions of open space.

The preceding list of urban space functions is by no means exhaustive. Additional functions such as the provision of wildlife habitat (Shafer and Moeller 1979), resource preservation and the preservation of land for future urban expansion (Wright, Braithwaite and Forster 1976) are also mentioned. These latter functions, however, are not as universally recognized as are the first six functions listed.

Water features are a popular component of urban open space. These features may help fulfill any of the ecological, utility, safety, city forming, aesthetic or recreation functions of open space. Water does, however, have a special relationship with the aesthetic and recreational functions. This special relationship has been noted in association with: urban coastal areas and water fronts (Robinson 1976; Tanner 1973), urban lakes and ponds (Clawson 1969; Gordon 1981; Tourbier and Westmacott 1976), urban rivers (Clay 1979 and Mann 1973), and decorative water features such as fountains and reflecting pools (Campbell 1978; Litton *et al*. 1974). Within a provincial context, this special relationship between water and recreational open space has been recognized in the current urban parks program of the Alberta government. New parks created under this program have all had water features identified in their master plans as a major characteristic of their design (Lacey 1983).

Urban stormwater lakes are also examples of open space features with dominant water components. Although water features have played significant roles in urban open space in the past, stormwater lakes represent a new form of open space within residential communities. These lakes are significant in that they are intended to be multi-functional as opposed to primarily unifunctional. The fulfillment of these functions would seem to suggest that urban open space in the form of stormwater lakes and their attendant land fringes will have a positive effect of the quality of the urban environment.

B. Urban Stormwater Lakes

Stormwater lakes merit investigation because of their potential impact on the quality of the urban environment. In this study, an urban stormwater lake is defined as a permanent water body utilized primarily for the collection, storage and controlled discharge of natural runoff in an urban setting (Calgary 1981). A greater understanding of these lakes and their potential effect on the urban environment will be facilitated by examining their background in Western Canada and by examining their primary and secondary functions.

The Background of Stormwater Lakes in Western Canada

Stormwater detention has been successfully applied as a stormwater management technique in various countries throughout the world during the past fifty years (Marselek, Weatherbe and Zukovs 1982). Its history in Western Canada is more recent. Winnipeg, Manitoba was the first city in Western Canada to develop stormwater lakes. Tottle (1979) and Bright (1983: pers. comm.) describe how a local house builder developed the first stormwater lake in Winnipeg as part of the Southdale Subdivision in 1965. The housebuilder saw the market potential inherent in providing a lake in a residential neighbourhood. In the process he found that compared to the traditional method of stormwater management, the stormwater lake substantially reduced his drainage service costs (Tottle 1979). At present there are about fifty stormwater lakes in operation in the Winnipeg area with plans to construct more lakes as new subdivisions are developed (Stanley Associates 1981). Winnipeg's master drainage plan shows the continued expansion of the stormwater lake system at least until the year 2020 (Tottle 1979).

More recently other Western Canadian urban centres have become involved with stormwater lakes. Edmonton, Alberta serves as a good example. Following Winnipeg's lead, the first stormwater lake was constructed in Edmonton in 1978 (Genstar Development Fact Sheet, n.d.). This lake is known as Beaumaris Lake and is located in the Castle Downs area situated in north Edmonton. Additional lakes such as Bearspaw in South Edmonton and Andorra Lake in Northeast Edmonton have followed. Similar development or plans for development in urban areas such as Regina, Saskatoon, Calgary and Strathcona County demonstrate the existing trend towards the construction of stormwater lakes in Western Canadian cities (Michaels 1983).

Stormwater Management Function

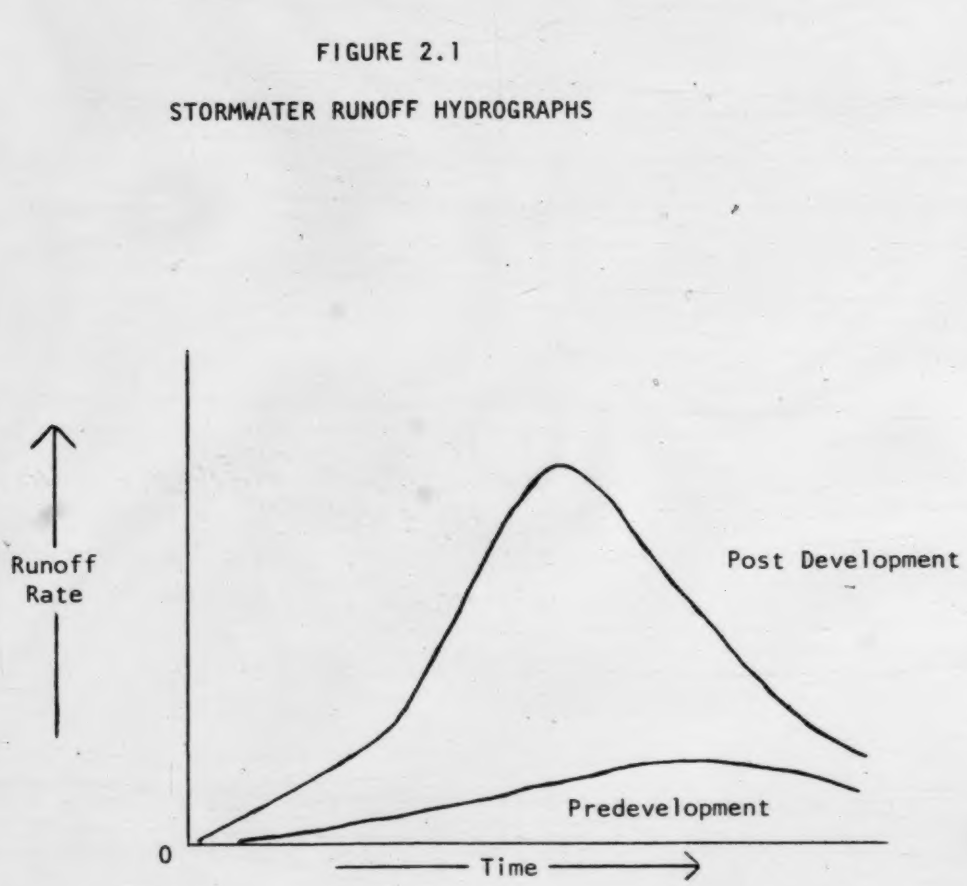
Numerous stormwater lake functions have been identified in the literature. These functions include utility, amenity/real estate, recreation (Fekner 1978; Mulamoottil 1979) and runoff control, sediment control, recreation uses, aesthetic value, fish and wildlife habitat, and water storage (Gill and Kelly 1978). Although this broad scope of functions has been identified, there appears to be a general concensus within Western Canada that those functions relating to runoff control or utility are usually of primary importance (Alberta Environment 1976; Calgary 1981; Edmonton Parks and Recreation 1980; Fort McMurray 1982; Gill and Kelly 1978; Stanley Associates 1981; Tottle 1979).

The need for some form of stormwater management arises in almost all types of new urban development. The development of land from a rural to an urban setting is accompanied by an increased rate and amount of rainwater runoff from the site. This increased runoff is due to the presence of a greater amount of roadways, roofs, parking lots and other impervious surfaces. It is also due to the fact that the leveling and grading of the terrain also tends to decrease the amount of ponding and absorbtion from that which took place previously (Hodgson 1982; Sussman and Havlicek 1982).

Figure 2.1 provides a graphic representation of the runnoff hydrographs of a site before and after development. The predevelopment runoff is characterized by a slowly building elongated peak. Post development runoff is characterized by a greater runoff rate which also peaks earlier than the predevelopment runoff. In order to avoid on-site flooding as a result of site development, some form of stormwater management must be implemented.

FIGURE 2.1

STORMWATER RUNOFF HYDROGRAPHS



Adapted from Gill
and Kelly 1978:2

Various methods of stormwater management are currently being used in Canadian cities. These methods form a portion of the water discharge system in these cities. Figure 2.2 provides a conceptual framework for stormwater management within the overall context of water resources planning and management.

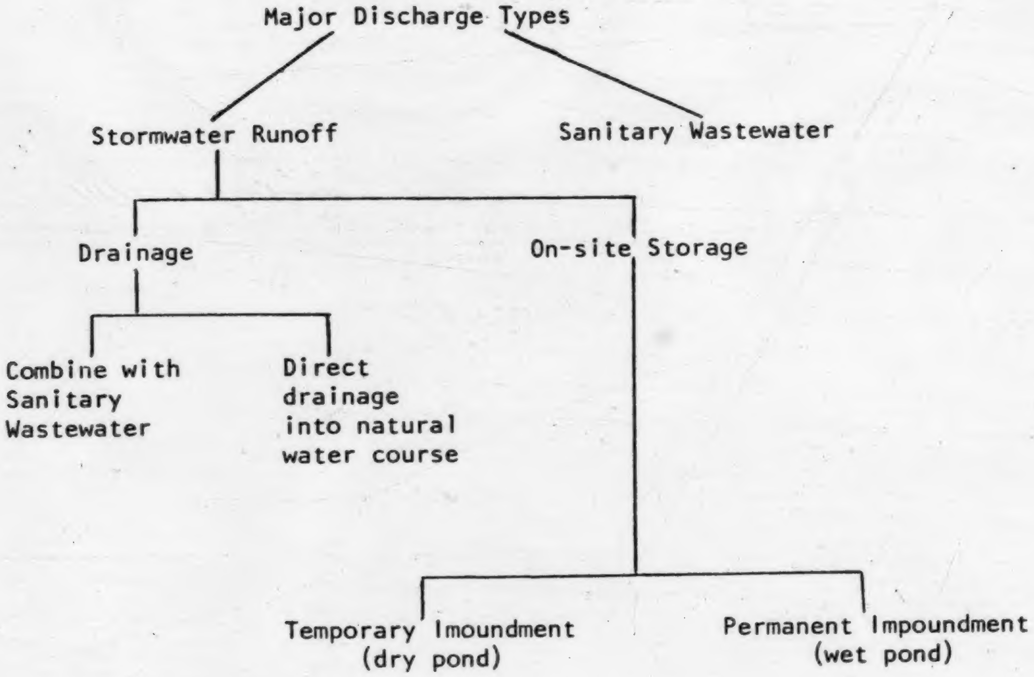
The two major water discharge types indicated in Figure 2.2 are stormwater runoff and sanitary wastewater. One alternative for the management of stormwater is to drain it directly from the site. This method may be accomplished by either combining it with the sanitary wastewater system or by draining it through an independent conduit system into a natural water course. The second and more recently developed management alternative is on-site storage. Storage may be facilitated either through the use of temporary impoundments which eventually dry up after a storm or through the use of permanent impoundments which return to a normal water level after a storm. It is these permanent impoundments or stormwater lakes which are the focus of this study.

In fulfilling its stormwater management function a stormwater lake is designed to collect, store, and discharge water at a controlled rate. The effect of this process is that the lake has a fluctuating water level (Figure 2.3). Stage 1 of Figure 2.3 represents the lake at a normal water level between storms. Stage 2A represents a storm period during which inlets are directing stormwater from the surrounding drainage area into the lake. This water is entering the lake at a greater rate than the water exiting through the controlled outlet. As a result the water tends to back up causing the water level to rise. Stage 2B shows the case of a rare storm estimated to be the extreme over a typical 100 year period. In this instance the capacity of the lake is exceeded and water is directed towards receiving streams through designed surface pathways. In Stage 3 the rainfall has ceased, causing the water entering the lake to stop while the water exiting from the lake continues at a controlled rate. Consequently, the water level of the lake begins dropping. Stage 4 represents the lake at normal water level again. At this point the stormwater is neither entering or exiting from the lake.

The current trend towards on-site storage through the use of stormwater lakes as a stormwater management method is primarily based on the capital savings realized by the developer and municipalities involved. In many cases the capital construction costs of developing an open lake and its limited conduit system are substantially less than the costs of tunneling the alternative conduit system required for the direct drainage of stormwater from the site (Stanley Associates 1981; Chambers and Tottle 1978; Gill and Kelly 1978; Tottle 1979). Evidence in support of this assertion is provided by Tottle (1979) who has listed a series of cost comparisons of the capital cost of developed stormwater lakes in Winnipeg versus the alternative of constructing a conduit system of stormwater management for the same areas. Over the eight stormwater lakes examined in the study,

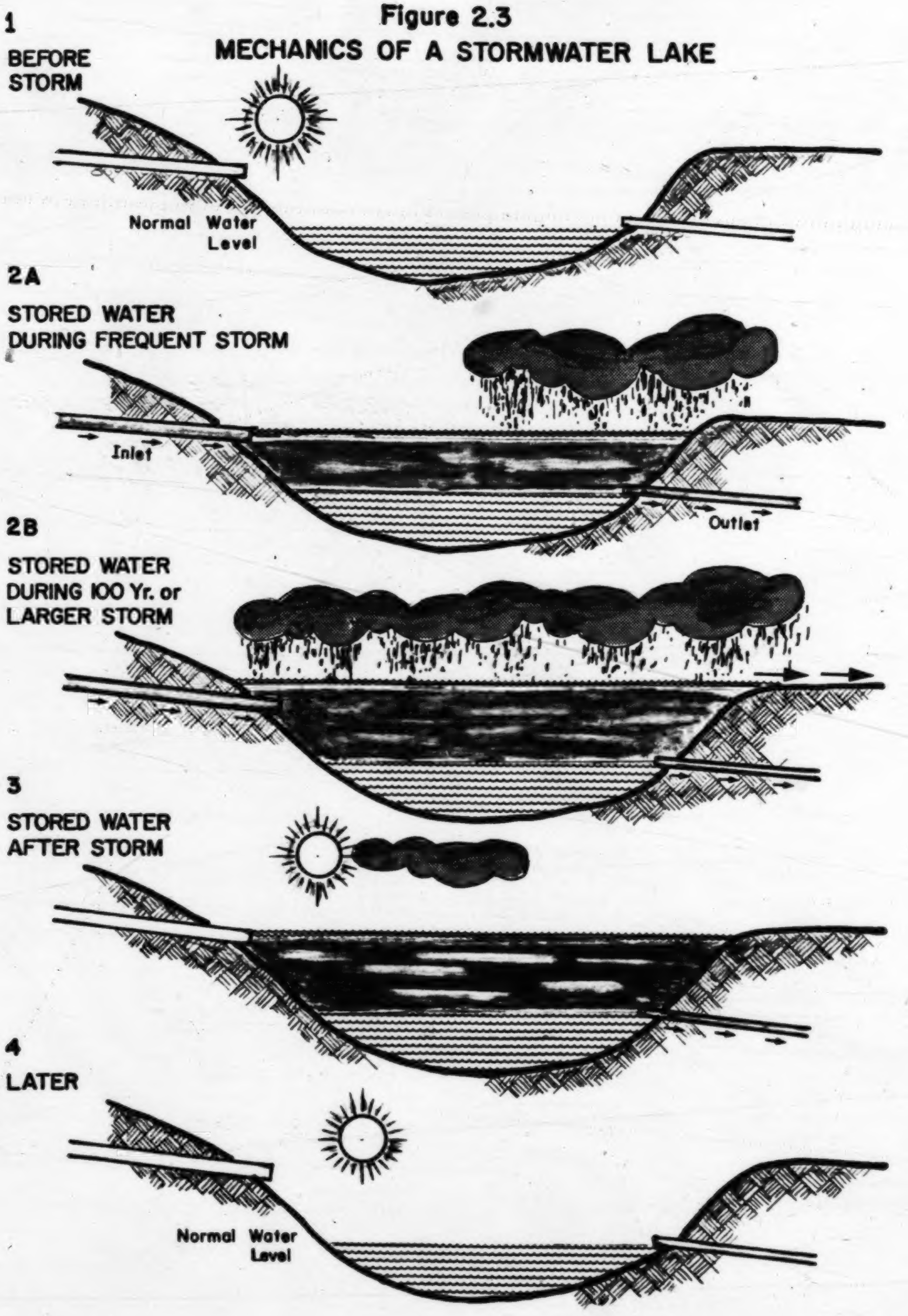
FIGURE 2.2

URBAN WASTE-WATER DISCHARGE SYSTEMS


Major Discharge Types
Stormwater Runoff
Sanitary Wastewater
Drainage
On-site Storage
Combine with Sanitary Wastewater
Direct drainage into natural water course
Temporary Imoundment (dry pond)
Permanent Impoundment (wet pond)

Adapted from Fekner 1978:17b,
Mulamoottil 1979:121

Figure 2.3
MECHANICS OF A STORMWATER LAKE


1
BEFORE STORM
Normal Water Level
2A
STORED WATER DURING FREQUENT STORM
Inlet
Outlet
2B
STORED WATER DURING 100 Yr. or LARGER STORM
3
STORED WATER AFTER STORM
4
LATER
Normal Water Level

Adapted from:
Edmonton Parks and Recreation 1979

the average capital cost of a conduit system was estimated to be $ 19,039,000 versus an average capital cost of the stormwater lake systems of $ 12,820,000 per lake. This difference in costs represents an average capital cost savings of $6,402,000 or 36 percent for each stormwater lake development. In addition to these cost savings, developers often attempt to capitalize on the secondary functions of the lakes by charging a higher premium for lots in the vicinity of the lake (Baxter and Mulamoottil 1981).

Secondary Stormwater Lake Functions

Stormwater lakes are examples of urban open space features with major water components. It is primarily due to this characteristic that secondary functions involving aesthetics and recreation have been expected from stormwater lakes.

Aesthetic functions of stormwater lakes result in a direct visual improvement of the development (Gill and Kelly 1978). This form of aesthetic function may also manifest itself in more subtle ways which involve an individuals perception of his environment through senses other than sight.

Recreation is another secondary function of stormwater lakes. In this study a broad meaning is implied through the use of the term recreation which in effect includes the aesthetic functions such as the enjoyment of a pleasant view (Clawson 1969). A broad recreation function of stormwater lakes is recognized by municipal stormwater policies (Calgary 1981; Edmonton Parks and Recreation 1980; Fort McMurray 1982), engineering sources (Gill and Kelly 1978; Tottle 1979) and general research sources (Marsalek *et al*. 1982; Fekner 1978). Mulamoottil (1979) recognizes the existence of a recreation function but expresses concern about the use of these lakes for active recreation.

Three basic categories of water-based recreation have been discussed in the literature. These categories are: primary recreation, secondary recreation and tertiary recreation (Calgary 1981; Edmonton 1979; Fort McMurray 1982). The rationale for using these categories is that they have been applied for operational purposes by the authorities responsible for the management and regulation of stormwater lakes. These categories serve as a basis for allowing or disallowing recreation activities to occur at stormwater lake sites.

> Primary Recreation - involves active and prolonged body contact with the water and includes activities such as swimming and wading.
>
> Secondary Recreation - involves activities done on the water such as canoeing, sailboating, paddle boating, skating; and taking things out, such as fish, bugs and plant material. Direct body contact with the water may occur but would be limited or of short duration.
>
> Tertiary Recreation - involves scenic pleasure and visual stimulation derived from the presence of a water environment and land based activities enhanced by a water feature.
>
> Adapted from Calgary 1981
> Edmonton Parks and Recreation 1979
> Fort McMurray 1982

Although formally disallowed, some primary recreation normally occurs at stormwater lakes whether it be young tadpole hunters wading in the shallows (Mulamoottil 1979) or unauthorized swimmers (Tottle 1979). Secondary activities are generally permitted depending on water quality. Tertiary activities are almost always permitted and are often encouraged through the provision of public park land along part or all of the perimiter of the lake.

Although limited to secondary and tertiary levels, recreation is generally seen as an important secondary function of stormwater lakes. Evidence of the actual achievement of benefits resulting from recreation participation at stormwater lakes is needed to support the idea that stormwater lakes make a positive contribution to the urban environment. Since these benefits are hypothesized as occurring to the residents of the communities surrounding stormwater lakes, it is to these residents to whom we must now turn. The behavioural approach to studying recreation has been selected as the method of investigating the existence of these recreation benefits. The appropriateness of this approach will now be discussed.

C. Approaches to Studying Recreation

There are several valid approaches to the study of recreation. Gold (1982) lists four of these approaches as: the resource approach, the activity approach, the economic approach and the behavioural approach. Under the resource approach to studying or planning recreation the physical or natural resources are felt to determine the types and amounts of recreation opportunities available. The emphasis in this approach is on the resource rather than the user (Gold 1980).

The activity approach to recreation is based on existing and past participation. The focus changes from the natural characteristics of the resource to the quantification of past participation, in particular recreation activities. Past participation in selected activities is used to determine what opportunities will be provided in the future (Gold 1980).

The economic approach to studying recreation adds the concept of value. In this approach the "... economic base or fiscal resources of a community ... determine the amount, type, and location of recreation opportunities" (Gold 1980:49). The value attached to recreation is determined on an economic basis. Clawson and Knetsch (1966) outlined the basis for this approach in their book titled *Economics of Outdoor Recreation*. Other more recent work has advanced the economic approach (Darragh, Peterson, and Dwyer 1983; Wennergren and Johnston 1979; and Knetsch and Davis 1979). The underlying intent of these authors has been to establish a proxy for the essentially non-market priced commodity of recreation. Poudel (1979) identified property value studies as being one feasible method of investigating the economic value of social benefits such as recreation. An example of a specific study utilizing property values as an economic approach to recreation was completed by David and Lord (1969). This study concluded that the increased property values around artificial lakes reflected the positive value of social benefits such as recreation resulting from the presence of the lake.

The final approach to the study of recreation as identified by Gold (1980) was the behavioural approach. The focus of this approach is on "... recreation as an experience, why a person participates, what activities are preferred, and what happens to the person as a result of this activity" (Gold 1980:49). This is the approach that has been selected for the investigation of the recreation function of the Beaumaris Lake setting. This approach was selected for its focus on the recreationist and his/her perceptions of the recreation opportunities available at Beaumaris Lake.

The Development of the Behavioural Approach

Marion Clawson played a significant role in the development of the behavioural approach through the presentation of his model of the 'recreation experience' (Foster 1977; Mercer 1971; Sadler 1978). This model expands the examination of recreation from simply on-site activity to five distinctly different phases which include: 1) anticipation; 2) travel to the site; 3) on-site experience and activities; 4) travel back; and 5) recollection (Clawson and Knetsch 1966:33-34). The major contribution of Clawson's model is that recreation is examined in terms of the experience which is extended both before and after the actual activity participation stage. Another important contribution is that satisfaction is singled out as an important part of this experience. Although recognized for its behavioural nature, Sadler (1978:3) points out that Clawson's model has some similarities to the "activity approach" in that ". . . site activity is the central "good" in recreation, the focal phase which gives the others definition".

The behavioural approach was further distinguished from the activity approach through the work of Driver and Tocher (1979). These authors viewed recreation as a psycho-physiological experience measured in terms of recreational responses. In describing their approach the following non-mutually exclusive postulates were stated:

> 1. Recreation is an experience that results from recreational engagements.
> 2. Recretional engagements require a commitment by the recreationist.
> 3. Recreation engagements are self-rewarding, the engagement finds pleasure in and of itself; and recreation is the experience.
> 4. Recreation engagements require personal and free choice on the part of the recreationist.
> 5. Recreational engagements occur during nonobligated time.
>
> Driver and Tocher 1979:87

The authors go on to state that the first postulate defines what recreation is while the remaining four serve as description to differentiate from other forms of human behaviour. Driver and Tocher's (1979) version of the behavioural approach clearly identifies and separates the concept of experience from actual participation.

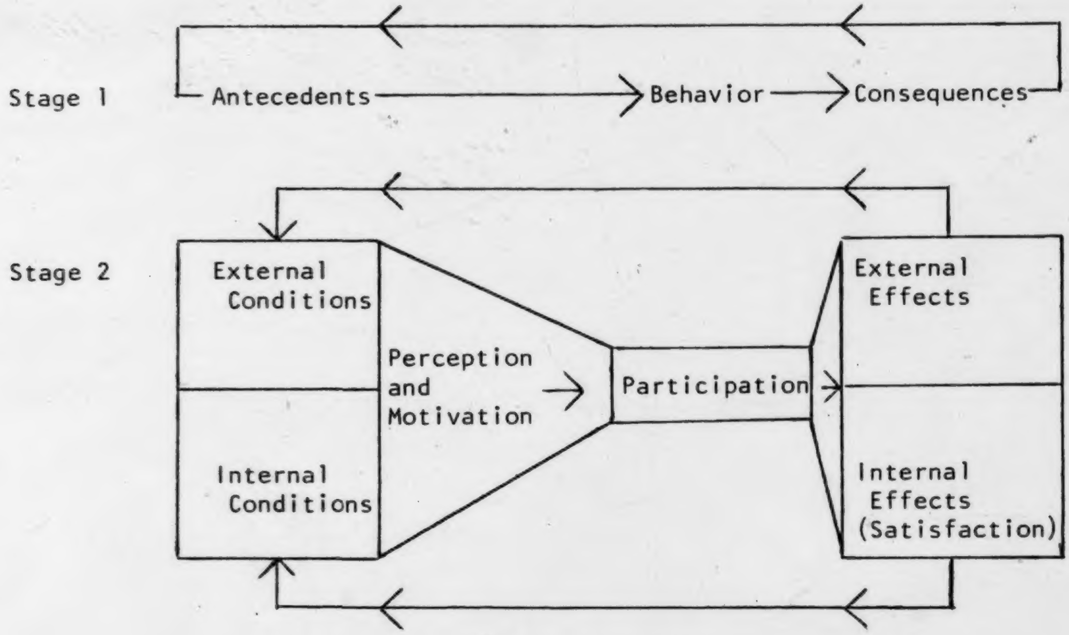
The behavioural concept of recreation as an experience is not as convenient for researchers and planners as the concept of recreation as an activity. Under the behavioural approach it is not possible to define something as recreation simply because a person is involved in a certain activity. However, the more complex investigation of motives, perceptions, preferences, and satisfaction required of the behavioural approach, permit a more indepth investigation into "why" an individual participates in "recreation activities". The behavioural approach also facilitates a greater understanding of the satisfaction and longer term benefits from the engagement.

A Behavioural Model of the Recreation Experience

The following model helps to clarify the behavioural view of the recreation experience.

Figure 2.4

A BEHAVIOURAL MODEL OF THE RECREATION EXPERIENCE


Stage 1
Antecedents
Behavior
Consequences
Stage 2
External Conditions
Internal Conditions
Perception and Motivation
Participation
External Effects
Internal Effects (Satisfaction)

The flow of this model follows the antecedent, behaviour, consquences and feedback loop pattern illustrated in stage one. Antecedents may be divided into those which are external and to those which are internal to the recreationist. External antecedents include the physical, biological, social and managerial components of the environment and exist independently of the recreationist. Internal antecedents include the genetic and socio-demographic make up of the recreationist. These internal and external conditions are interpreted through the individuals perceptions of them. Perception theory has been characterized by many conceptual and definitional problems (Bevan 1958; Lowenthal 1972). Nevertheless the following short definition has been selected for use in this study:

> Perceptions are . . . images and ideas derived from some sort of interaction between what the individual selectively receives from his milieu (via his sensory apparatus), and his scheme of values, conscious memories, and subconsciously stored information.
>
> Wood 1970:131

At the point of perception the recreationist simultaneously begins to identify his recreation preferences in terms of his motivations. Driver and Tocher (1979) describe motivations as the drives or primary forces which either push or pull the recreationist towards involvement in some type of recreation engagement. The actual choice of one engagement over another represents the preference of the recreationist. Preference connotes choice based on perceptions and motivation (Cooksey, Dickinson and Loomis 1982; Peterson 1967).

The next component of the model is actual participation in a recreational engagement. This participation is based on a funnelling of the external and internal conditions through the recreationist's perception, motivation and preferences. The participation component of the model corresponds to the behavioural component of stage one.

The consequences follow the behaviour component. The consequences in this model are both external and internal in nature. External effects include those on the biological system, the economic system, and the social system. Using hiking as a hypothetical example, an impact on the biological system might be damaged plant growth along the hiking trail; an impact on the economic system would include travel expenses to and from the site; and an impact on the social system might include the beginning of a new friendship between two hikers. The internal effects impact on the recreationist himself, and may change his future perceptions and motivations. Of primary importance in terms of the internal effects is the level of satisfation a recreationist experiences. It is important to note the feedback loops in the model from the consequences back to the antecedents. A cyclical process is created where the antecedents are constantly changing based on the results of previous recreation engagements.

The incorporation of Driver and Brown's (1978) recreation opportunity demand hierarchy into the model ensures this behavioural perspective. Level one of their hierarchy relates to demands for a recreation activity. Level two of the hierarchy consists of demands for opportunities to experience situational attributes that characterize the quality of preferred recreation environments. These demands consist of the external conditions of the model. Level three concerns demands for opportunities to realize specific psychological outcomes such as satisfaction. Finally, level four of the demand hierarchy consists of demands for opportunities to realize the benefits that flow from the satisfying experiences such as improved mental health. The advantage of the incorporation of this demand hierarchy is that it permits a flexible and yet rigorous framework for studying recreation environments that can provide opportunities for a wide range of recreation experiences (Swinnerton 1982).

Satisfaction

Satisfaction has been singled out in this study as one of the primary variables of investigation. Sadler (1978:3) states that: ". . . the level of user satisfaction provides the most meaningful overall measure of the quality of the experience provided by a recreation area". Dumazedier (1974:74, 75) is even more explicit in emphasizing the importance of satisfaction in leisure when he states: ". . . The search for a state of satisfaction is the prime condition of leisure. . . When this state of satisfaction ends or deteriorates the individual tends to discontinue the corresponding activity." The fact that user satisfaction is almost always a major goal of recreation and leisure services underlines the significance of this concept (Beard and Ragheb 1980; Bultena and Klessig 1969). Leisure satisfaction is conceptually defined in this paper as:

> . . . the positive perceptions or feelings which an individual forms, elicits or gains as a result of engaging in leisure activities, and choices. It is the degree

> to which one is presently content or pleased with his/her general leisure experience and situation.
>
> Beard and Ragheb 1980:22

The reference to "positive perceptions or feelings" remains relatively abstract in this definition. Bultena and Klessig (1969:349) addressed this difficulty by suggesting that satisfaction ". . . is a function of the degree of congruence between aspirations and the perceived reality of experience". In this statement the "positive perception or feelings" of Beard and Ragheb's (1980) definition can be identified as the difference between expectations and perceived reality.

Francken and Van Raaij (1981) and More and Buhyoff (1979) agree with the assessment that satisfaction is the discrepancy between expectations and the actual situation. When expectations are met or bettered, satisfaction results. Francken and Van Raaij (1981) expand on this assessment by suggesting that an individual's expectations may derive from earlier experiences (temporal comparison), achievements in other spheres of life (spatial comparison), or the perceived level of satisfaction that others derive from leisure activities (social comparison).

It is necessary at this point to define satisfaction in a constructive sense. A construct places hypothetical boundaries on a concept. The purpose of defining satisfaction as a construct is to enable its observation and measurment (Ragheb and Beard 1982). Two basic approaches to a constructive definition of leisure satisfaction have been taken in the literature. The first type of construct to be examined is based on the idea of measuring the multiple dimension of satisfaction, while the second type of construct is based on an overall measure of satisfaction in terms of the leisure experience.

Past research utilizing a multiple dimension construct, has ranged from the examination of only a few satisfaction dimensions to the investigation of up to forty-seven dimensions.

Ragheb expanded his satisfaction construct in his work with Beard. One example of a multiple dimension satisfaction construct was labled the Leisure Satisfaction Scale (Ragheb and Beard 1980). This scale was divided into six subscales of satisfaction dimensions derived from existing theories and models of leisure, recreation, and play, and through the factor analysis of the instrument's constituent items. The six subscales dealt with the following dimensions of leisure satisfaction: 1) psychological; 2) educational; 3) social; 4) relaxational; 5) physiological; and 6) aesthetic. Hawes (1978) utilized a similar multi-dimensional satisfaction construct in a study using thiry-two satisfaction statements which he found to cluster into interpretable factors both across all leisure time pursuits and in relation to specific pursuits.

Research by Tinsley and Kass (1979) and Tinsley, Barrett and Kass (1977) has also utilized a multiple satisfaction dimension instrument. Their studies investigated forty-five need dimensions related to leisure satisfaction. They found that the majority of these need satisfier dimensions varied significantly between selected leisure activities. Pierce (1980) conducted a study which utilized forty-seven satisfaction items for analysis. Through the use of a cluster analysis technique he concluded that the following dimensions to leisure satisfaction emerged: intimacy, relaxation, achievement, novelty, mental versus physical excitement and power. The major contribution of these studies has been the development and validation of leisure satisfaction theory.

The second type of satisfaction construct does not attempt to divide the satisfaction concept into multiple dimensions but instead attempts to obtain an over all measure of leisure satisfaction. Foster and Jackson (1979) operationalized satisfaction in their campground user survey by asking the following question: "Could you tell me how you feel about your stay in this campground?". Responses to this question were coded to obtain a "crude measure" of camper satisfaction. Manning and Ciali (1980) also used an overall measure of satisfaction in their study of the implication of recreation density on user satisfaction. A third study that utilized an overall measure of satisfaction was Vaske *et al.*'s (1980:195) study which investigated possible differences in satisfaction between consumptive and non-consumptive recreationists. Satisfaction was measured by asking respondents the question: "Overall, how would you rate your day/trip?" Responses were then coded on a six point scale ranging from poor to perfect.

Although the actual findings cited in these studies were not necessarily relevant to the present study, the nature of the satisfaction question and its application in each study was relevant. In all of these studies the overall measure of satisfaction was used as an "indicator of the quality of the experience" which was then examined in terms of other factors such as profile variables of the participants. This overall satisfaction construct served an evaluative and functional role in the investigation of contributing factors to the recreation experience. Studies employing a multi-dimensional satisfaction construct tended to examine the satisfaction concept in more detail but at the expense of a broader view of the recreation experience. Research comparing the two types of constructs concluded that there was no simple "best" measure of satisfaction, only different measures useful in different situations (Dorfman *et al*. 1976, Schinkel 1980).

An overall measure of satisfaction will be used in this study because it is appropriate to serve as an evaluative indicator of the recreation experience associated with stormwater lakes. This type of construct is used because it also facilitates the use of a simpler questionnaire than would be required to examine a multi-dimensional satisfaction construct.

At this point it should be noted that dissonance reduction is a weakness that is common to all measures of satisfaction. This concept refers to the problem whereby someone who has invested considerable time and money may be unwilling to admit that he/she has been dissatisfied and will tend to give a positive evalutation of the experience (Heberlein and Shelby 1977). The implication of dissonance within this study will be discussed in the final chapter.

D. Factors Related to Satisfaction

An overall measure of resident satisfaction provides an evaluative criterion on which to base the examination of the recreation function of urban stormwater lakes. Factors which have an impact on satisfaction will now be examined. By examining these factors a better understanding of the implications of stormwater lakes on the quality of the urban environment will be developed.

The variables to be examined fall within the external and internal conditions as previously outlined in the model of the recreation experience (Figure 2.4). Selected variables from within these categories will be examined based on their identification in previous research and literature regarding stormwater lakes. As this area of research is relatively young, parallel studies dealing with urban open space and outdoor recreation environments will be used to supplement the stormwater lake research and literature.

External Conditions

The external conditions of an environmental setting may be defined in terms of its physical, biological, social and managerial components (Clark and Stankey 1979). This breakdown offers a convenient framework for examining the external conditions affecting satisfaction. The justification for using this framework is that it provides a method of organization to what alternatively would be a disjointed discussion. The grouping of the external conditions has been made based on an attempt to minimize the differences within categories and maximize the differences between categories. External conditions of the setting which may have in actuality fallen somewhere between two categories were placed in one category or the other as an operational decision made by the researcher.

The **physical component** of an open space recreation environment plays a major role in the recreation experience. The two major sets of characteristics that fall under this category include the actual site design features and how the site is perceived in terms of aesthetics.

Site design is "a thought process that proposes to anticipate problems of land usage and promote a physical form solution to ensure that the problems never occur" (Rutledge I971:viii). The actual physical form given to the site should reflect the considerations of purpose, function and aesthetics based on user needs and site capability. Hester (1975) notes that planners must be careful to view the site design characteristics from positions of the potential user if the site is to be successful. Specific relationships which must be addressed in site design include the interaction between: natural elements, use areas, major structures, people, animals, and the forces of nature (Rutledge 1971). An additional aspect of design relates to the physical safety of park users.

A multitude of specific design relationships exist which could be studied, but the importance of user perception must be noted. In his study on provincial campgrounds, Foster (1979) stated that ". .. the actual camping environment did not determine camping satisfaction but rather camping satisfaction was probably more closely related to variation in the campers' perception of their camping environment". If this statement holds for other open space environments, then the user must be consulted about his perception of an environmental feature when investigating his satisfaction in terms of the environment.

Design features have been briefly addressed in stormwater lake research. Baxter and Mulamoottil (1981) found that a large percentage of the residents living around a relatively developed Ontario stormwater lake would have preferred a softer or more natural design. Other research has found that smaller pond sizes reduces recreational expectations (Marsalek *et al*. 1982).

The site aesthetics are the second physical characteristic of an open space recreation environment listed. The internal process of the aesthetic response can be outlined in the following manner. First an environmental stimulus is received through one or more of the tactile, visual, auditory, olfactory or gustatory senses. The stimulus then enters the observer's state of mind where it is evaluated in terms of factors ranging from the observer's physiological condition and emotional state through to the novelty of the situation. The context of this observation also forms a backdrop for the evaluation of the environmental stimulus. The result of this complex evaluation is the aesthetic experience of the observer (Litton *et al*. 1974).

Design criteria for the visual resource aesthetic response is based on variety, vividness and unity (Litton 1980). Variety relates to the continuum involving the number and diversity of parks - the richness. Vividness is that quality of the landscape that makes a composition memorable. Finally, unity is achieved through a harmony of the park. A balance of these criteria are often used by professionals to evaluate the aesthetics of a site.

The discussion so far has centred around the academic and professional view. Hester (1975) identifies the possibility that the 'professional' may have different taste and style than the general population. It is important that the aesthetics of an open space site be designed from the perspective of the general public. Only if this is done will the aesthetics of a site contribute to the quality of the urban environment. For example, Ulrich and Addoms (1981) in their research on the benefits of a residential park found that aesthetic features were associated with the park's natural elements such as trees and grass. The benefits related to these aesthetic features ranked as one of the highest benefits being received from the park setting.

Perceived aesthetic benefits of stormwater lakes were identified in Baxter and Mulamoottil's (1981) study by both the residents and interviewed officials. Tottle (1979) stated that: " . . . a subdivision planner is quite free to manipulate . . . lake features to maximize aesthetics". Given this flexibility in design the aesthetics of each lake may vary substantially. The physical components of stormwater lakes in terms of design and aesthetics appear to be important characteristics in determining the lake's effect on the quality of the urban environment.

The second category of factors which have an impact on the satisfaction of stormwater lake community residents can be termed the **biological component**. The two biological characteristics to be examined in this study deal with 1) man's relationship with nature and 2) water quality.

Hester (1975) suggests that urban open space settings serve an important role in facilitating man's interaction with nature. This need to interact with nature has been a popular theme presented by authors such as: Williams (1973) who discusses the intimate relationship betwen the country and the city; Manning (1979) and his ideas about incorporating nature into the city; and Olmsted who ". . . created, in Central Park, an area where urbanites could taste the joys of rural life . .." (Fabos, Milde and Weinmayr 1968: 18).

Attempts have been made to substantiate or refute the idea that natural settings within the city meet some sort of inner need. One study found that subjects were found to relax more when viewing slides of vegetation or vegetation and water than when viewing slides of urban scenes without vegetation (Driver and Rosenthal 1978). More and Payne (1978) found that visitors to natural areas near cities who arrived at the site with negatively valued moods left the site in significantly better moods. Both of these studies indicate a positive relationship between urban natural features and benefits to urban residents.

Water quality is the second type of biological factor which may have an impact on the satisfaction of stormwater lake community residents. Technical measures of water quality are based on its many chemical parameters and therefore lies predominantly within the domain of the physical scientist. Parameters used in technical measures of water quality may include: bacteriology, dissolved oxygen, biochemical origin demands, suspended solids, pH, temperature, odour, colour, turbidity, organic chemicals, pesticides, inorganic chemicals, toxic chemicals, radioactivity and unspecified substances (Alberta Department of Health 1970). Unfortunately there is no single accepted index of water quality or pollution. Both the parameters themselves, and the acceptable levels of those parameters, vary from one jurisdiction to the next (Coughlin 1976). Water quality guide lines, such as those recommended by the Alberta Department of Health (1970) are used for operational purposes.

An alternative to the technical view of water quality is based on the social science concept of perception. Coughlin (1976:206) states that the ". . . perception of water quality has a reality of its own which is just as valid, and perhaps of more importance in human decision making than the reality of the measurement of physical and chemical properties of a water body". Coughlin (1976) then qualifies this statement by observing that useful planning and management action may be taken based on water quality perceptions because the latter do in fact reflect physical attributes.

Research on water quality perception has identified some of the primary parameters. Barker's (1976:213) survey of beach users and lakeside cottage residents asked "How can you tell if the water is polluted?" Responses identified appearance in terms of algae and floating material as the primary water quality indicator. Additional indicators included odor, taste, and scientific tests or posted signs. A similar question posed by David (1971) revealed that algae and green scum were the major indicators followed by: murky, dark water; debris; suds and foam; and cans and glass.

Stormwater lake research has addressed some of the biological factors which may affect resident satisfaction. Baxter and Mulamoottil (1981) briefly addressed the issue of nature at stormwater lake sites. They found that ". . . 70% of Aquitaine residents thought there should have been more areas left in a natural state around Lake Aquitaine." This response suggests that the residents around that lake felt that it should serve a greater role in providing them with a link to nature.

Water quality as a factor of resident satisfaction, has been a strong focus in stormwater lake research. Technical studies, such as that undertaken by Chambers and Tottle (1978), have studied stormwater lake water quality parameters including: pH, true color, turbidity, threshold odour number, dissolved oxygen, lead, chronium, radium, zinc, copper, nickel, chloride, nitrate, total cloriform, and faecal coliform. Given data on these parameters Tottle (1979) concluded that the water quality of stormwater lakes in his study was acceptable for all types of recreation including primary contact recreation.

The opposite opinion is presented by Mulamoottil (1979) who felt that based on Windsor stormwater data the lakes are characterized by ". . . serious contamination due to enormous bacterial populations especially of faecal origin". On this basis, primary water based activities are judged to be potential health hazards when undertaken in stormwater lakes. Most Alberta municipalities seem to favour this latter view.

Conceptual measures of water quality have also been addressed in stormwater lake research. Baxter and Mulamoottil's (1981:20) "Environmental Satisfaction Scale" has been the most advanced approach in this area. These researchers constructed a scale based on resident opinion regarding the following six parameters: 1) murky or muddy water, 2) rubbish in the lake, 3) shoreline weeds, 4) lake weeds, 5) rubbish around the shoreline, and 6) smells or odours. One of their conclusions was that residents living closest to the lake were more dissatisfied with water quality than residents living further away. Baxter and Mulamoottil (1981) felt that this difference may have been related to the fact that residents living closer to the lake had paid a higher purchase premium for their home and were therefore more conscious of problems which might affect their investment.

A number of characteristics related to the **social component** of a site may have direct or indirect implications on user satisfaction. The three factors examined in this section are based on: 1) crowding and conflict; 2) symbolic ownership; and 3) vandalism and social devience.

Central to the concept of crowding is the idea that one of the motivations for participating in some type of outdoor recreation is the desire to get away from people and seek privacy (Hester 1975). If an individual feels that he is unable to obtain privacy in his recreation pursuit, he may feel "crowded". Conflict is a broader term and may be identified by an individual as ". . . goal interference attributed to another's behaviour" (Jacob and Schreyer 1980:369).

Becker (1978:251) explored the idea of crowding in a study of forest users. He found that ". . . users in low density zones were less tolerant toward sighting other individuals than visitors to higher use zones". Manning and Ciali (1980) found that when tested under hypothetical conditions respondents clearly showed a negative relationship between density and satisfaction. However in a field situation density was not proven to be related to satisfaction. Both of these studies suggest that the density satisfaction relationship is complex.

Although no research was found on stormwater lakes that examined crowding directly at the lake site, crowding in the surrounding neighbourhoods was addressed. Baxter and Mulamoottil (1981) in their stormwater lake study noted that residents did not generally perceive that there were too many homes near the study lakes. However, the residents living further away from the lakes felt that high housing density (crowding) was more of a problem than those living nearer the lake.

A second type of social factor relating to urban open space sites involves the concept of symbolic ownership of public space. This factor is evident when residents feel that they "own" a site. These feelings of ownership may result from: use, involvement in the requisition and design, and through the site's proximity to the individual residence (Hester 1973). The feeling of ownership is likely to be reinforced if the open space site serves a unifying function within the neighbourhood (French 1973). If the open space site is unique in any way it will help to define and identify the neighbourhood. The identification of the neighbourhood as being unique develops a sense of "place" for the residents within that community (Relph 1976). This feeling of ownership and sense of place help contribute to the quality of the urban environment.

A study by Brower and Williamson (1974) found that a sample of city neighbourhoods in Baltimore did possess ownership feelings toward open space in their area. One of the results of this feeling of ownership was that non-resident users were suspiciously viewed as "outsiders". In terms of stormwater lake research Baxter and Mulamoottil (1981) also found that the stormwater lakes in their study appeared to encourage a sense of community. This sense of community was evident through both Baxter and Mulamootil's (1981) resident survey and through their interviews with city officials.

A third major social characteristic concerns factors relating to vandalism and social deviance. These factors are negatively related to user satisfaction. A vandal may be considered to be a ". . . person who without lawful excuse destroys or damages any property belonging to another . . ." (Sykes 1979:11). Rutledge (1971) further identifies two types of vandals: 1) a relatively benign type performed by people whose basic respect for property is momentarily put aside by a devilish spasm; and 2) hard core types whose hang-ups consistently outweigh a basic respect or property. These vandals can cause extensive damage in parks which is a detriment to the regular users' satisfaction. Users may also be negatively affected by fear for their personal safety (Hester 1975).

Suggestions for solutions to these problems have ranged through: constant maintenance (Rutledge 1971), vandal proof and safety conscious designs (Rutledge 1971, Sykes 1979), to direct supervision (Hester 1975). The most popular solution mentioned is to keep the open space site alive with people (Rutledge 1971; Hester 1975; Whitaker and Browne 1971).

Baxter and Mulamoottil (1981) found that stormwater lake residents recognized the existence of social problems related to vandalism, teenagers and crowding. These social problems were mentioned by 36 percent of the respondents living within five minutes walk of Lake Aquitaine but were only recognized by 6 percent of the residents within five minutes walk of Lake Wabukayne. The city officials identified vandalism as being a problem, particularly at Lake Aquitaine where lamp posts, bulbs, and the consession stands had been damaged.

The **Management component** consists of two basic characteristics. The first characteristic is policy and regulation. The second characteristic concerns operations and maintenance. Both of these characteristics may have strong impacts on how residents perceive and enjoy an outdoor recreation site.

The need for policies and regulations within a recreation setting results from the attempt to safely fulfill the identified purpose of the site. Given a stated purpose of the provision of a recreation setting for the general public, regulations may be required when certain types of use "mar the unhampered recreation of the people" (Doel and Twardzik 1979). These regulations may be designed to protect the resource from the user or to protect users from other users.

The style of management ". . . is indicated by the number of user controls and their visibility" (Hoots and Buist 1980:28). If user controls are blatantly over emphasized the satisfaction of the recreationist may be reduced. The basis for this reduction in satisfaction is that the perception of too many controls may limit the individual's "free choice". This element of free choice or voluntary action has previously been identified as an important aspect of the recreation experience (Driver and Tocher 1979). Seeley (1973:210) states that: "The most successful and most acceptable techniques of visitor management are invariably the most subtle, persuasive and informative". In addition, it is important that the administration of the recreation setting continually reassess the site's purpose in terms of the user needs (Doel and Twardzik 1979).

Bultena, Albrecht and Womble (1981) examined user reaction to management restrictions in a study of backcountry hikers at Mount McKinley National Park in Alaska. It was found the users supported the management regulations related to rationing even though this policy was restrictive to the backpackers' freedom. This finding suggests that if users understand and are in agreement with the intent of a regulation, their quality of experience will not be negatively affected by its inforcement.

Maintenance factors are a second type of managerial characteristic related to the quality of the recreation experience. Adequate maintenance has implications for the aesthetics, physical safety and general attractiveness of the site as perceived by the public. One of the major concerns with maintenance from a management perspective is its high cost (Whitaker and Brown 1971). Rutledge (1971) suggests that a significant portion of the maintenance costs can be reduced through the provision of appropriate structural materials during the original construction period. Regardless of management concern about maintenance costs the quality of the recreation experience will be low if users perceive that the site is poorly maintained.

Both regulatory and maintenance characteristics have been partialy explored in research directly related to stormwater lakes. Baxter and Mulamoottil (1981) found that most residents felt that the responsibility of regulating and maintaining the lakes should rest with the city, followed by the developer. In addition, a minority of residents were willing to be assessed a fixed amount of dollars specifically for the management of the lake. The officials interviewed generally felt that the operation and maintenance of the lakes should be the responsibility of the city. Baxter and Mulamoottil's (1981) study also noted that one of the problems that residents perceived related to garbage found on the shoreline or in the lake. These problems make up a portion of the overall perception of water quality.

Tottle (1979:9) has calcuated that the maintenance costs for Winnipeg stormwater lakes would amount to about $37 per acre of serviced area annually. This total was based on the costs of algae and weed control, maintenace of public grassed areas and the inspection and removal of debris. Major omissions to existing research on stormwater lakes includes the investigation of whether the current levels of maintenance and regulation at stormwater lakes are perceived as adequate by residents living in the vicinity of the lakes, and secondly how these perceptions relate to the quality of the residents recreation experience in terms of that stormwater lake setting.

The external conditions of the recreation experience have been described in terms of the physical, biological, social and managerial component of the recreation setting. These characteristics have been further broken down into characteristics which appear to have significant influence on the quality of the recreation experience. The investigation of resident perception in terms of the external conditions will facilitate a better understanding of the quality of the recreation experience related to urban stormwater lakes.

Internal Conditions

The internal conditions affecting the recreation experience consist of the individual charactersitics of the recreationist. These characteristics range from the location of residence to socio-demographic variables such as: age, sex, education, family size, dwelling type and tenure, and family income. Past research related to the nature and effects of these characteristics on resident attitude toward stormwater lakes will now be discussed.

Both Debo's (1977) and Baxter and Mulamoottil's (1981) studies, on artificial and stormwater lakes respectively, identify the location of residence in terms of the water body as having significant affect on resident perceptions. Debo (1977) found that residents living nearer to the study lakes: 1) were more likely to identify the lake as a positive factor in their decision to purchase their home; 2) were more likely to purchase another home by an urban lake if forced to move; 3) were more willing to pay a yearly maintenance fee for the lake's upkeep; and 4) were more likely to feel that they received benefits from the lake such as those related to scenery, recreation and open space. Baxter and Mulamoottil (1981) found similar differences. Specifically, they found that respondents living nearer to the lake: 1) identified the lake as being more important in their decision to move to the area; 2) were less likely to feel that the density of housing in their neighbourhood was so high as to create a crowding feeling; 3) were more likely to actually use the lake site for recreation; and 4) tended to be more critical of problems related to visual and safety concerns. Although both studies clearly indicated that differences in the location of residence had a significant impact on resident perceptions of their neighbourhood environment few explanations as to the reasons for these differences were presented. One logical explanation that Baxter and Mulamoottil (1981) did offer was that after paying a higher premium for their housing, respondents living near to the lake were more conscious of their investment. These respondents were therefore likely to be more critical of problems related to the lake. However, having already made the investment, respondents living closer to the lake may have been reluctant to admit major shortcomings of the lake.

The characteristics of age and sex of the respondents have received little attention in urban lake perception studies. Baxter and Mulamoottil (1981) did investigate respondent education and found no relationship between that variable and respondent satisfaction with the stormwater lake. Other socio-demographic variables which they investigated but which were found to be unrelated to resident satisfaction with the lakes included: family size, dwelling type and family income. Suggestions as to why no relationships were identified were not presented.

Baxter and Mulamoottil (1981) did identify significant relationships between respondent satisfaction and the variables of dwelling tenure, occupation and length of residence. Respondents who owned their dwellings were more likely to be dissatisfied with the lake than respondents who rented their dwellings. Respondents occupied in professional-managerial positions were also more likely to be dissatisfied than other respondents. Finally, those respondents who had lived in the development longer were more likely to be dissatisfied than shorter term repondents. Again the researchers chose not to present any explanations of these findings. Regardless of this lack of interpretation, Baxter and Mulamoottil's (1981) study has identified some important relationships between respondent perceptions and their socio-demographic characteristics.

E. Summary and Conclusions

Four main sections have formed this review. The first section examined the past and present role of urban open space in determining the quality of the urban environment. In this section recreation was identified as one of the most important functions of open space.

The second section described the concept of urban stormwater lakes as a new development within the context of urban open space. As a form of open space, stormwater lakes were identified as unique due to their primary function of stormwater management. However, the question was raised as to the lakes capability in fulfilling secondary roles related to recreation.

Section three reviewed the behavioural approach to studying and to evaluating recreation. This section presented a model of the recreation experience and identified satisfaction as the key evaluative criteria for judging the quality of that experience.

The final section of the review used the behavioural model to isolate antecedent variables associated with recreation satisfaction. These variables were categorized as: the external conditions of the recreation experience related to the physical, biological, social and managerial components of the site, and the internal conditions related to the socio-demographic characteristics of the study population. The study of these variables and their interrelationships will provide a framework on which to evaluate the quality of the recreation experience associated with a stormwater lake site.

III. METHODOLOGY

A. Introduction

The research methodology of any study is intended to operationalize the study's goals and objectives. In the present study the data gathering technique utilized involved a survey of the study area residents' perception of Beaumaris Lake. This survey was achieved through the use of a resident self-administered questionnaire.

B. Methodological Aspects of the Study Area

The rationale for selecting Beaumaris Lake and the surrounding community as the research study area was based on a number of factors. The most significant factor was that Beaumaris Lake was the oldest residential stormwater lake within Edmonton having been completed in 1978 (Genstar Development Fact Sheet, n.d.). As a result, the expectations of residents living near to the lake have had relatively more time to be either verified or proven false. Also relating to Beaumaris Lake's age was the fact that the surrounding residential neighbourhood was more fully developed and settled than the neighbourhoods associated with other Edmonton stormwater lakes. A second reason that Beaumaris Lake was selected was that the residential area surrounding the lake was clearly identified as the Beaumaris Neighbourhood. This identity was strengthened not only by the presence of the lake itself, but also by the arterial roads surrounding the neighbourhood and by a uniform fence which boarders a major portion of the area. These roadways and fences tend to act as barriers which clearly identify the community (Edmonton Parks and Recreation 1982a). A third reason for selecting Beaumaris Lake was its relatively large surface area (34 acres) in comparison to the other stormwater lakes within Edmonton (3 to 6 acres). As a result of this larger lake area, a greater number of residences were located within a short walk of the lake. The Beaumaris Neighbourhood therefore offered a larger potential study population of residents than did alternative study sites within Edmonton. Based on these factors of age, community definition and lake size, Beaumaris Lake was chosen as the site for this study.

A decision was also made to examine one lake as opposed to two or more lakes as has been done in other similar studies (Baxter and Mulamoottil 1981; Debo 1977). The basis for this decision was that the residential development at the other existing stormwater lakes within Edmonton was in its infancy. A relatively low number of dwellings had been built at the other lakes and those that existed were only approximately one year old. Given this situation, alternative stormwater lakes outside the City of Edmonton were not studied in detail due to the financial and time restrictions placed on this research.

As an alternative to the analytic advantage of studying two or more lakes, extra emphasis was given to the comparison of lakeview versus non-lakeview residents within the Beaumaris study area. These categories were designed to allow comparisons to be made with Baxter and Mulamoottil's (1981) study which divided respondents into those who lived within a five minute walk of the lake and those who lived between a five and ten minutes walk away. Further comparisons were intended with Debo's (1977) study which differentiated between lakefront residents and residents living across the street from the lakefront residents. In the present study, lakeview dwellings were identified on the basis of a dwelling having an unobstructed view of the lake. Since all roadways present within the study area were only for local use they were not considered obstructions if a clear view of the lake was still possible. Non-lakeview dwellings included all dwelings within the study area which did not have an unobstructed view of the lake. Although the method of classification for the locational groups differs between studies, the distinction between dwellings nearer to the lake versus those further away is consistant. This consistency should allow "general" comparisons to be made between study findings.

C. The Resident Survey

The study of the recreation function of stormwater lakes could be validly undertaken using a research methodology such as an observational study. However, the decision to utilize a survey methodology in this study was primarily based on the desire to have the study subjects express their opinion and attitudes on a complex range of issues related to stormwater lakes.

Given the decision to utilize a survey method, the following data were sought from the Beaumaris neighbourhood residents: their original expectations concerning Beaumaris Lake; their actual recreational use of the lake; their attitudes towards the lake; and their socio-demographic characteristics. These data could have been collected through the use of either self-administered questionnaires or personal interviews. The merits and deficiencies of utilizing a self-administered questionnaire versus personal communications in social science research have been discussed by numerous authors including Babbie (1975), Bailey (1978), Burton and Cherry (1970), Kidder (1981), Moser and Kalton (1971) and Opperheim (1966). The general conclusion of these authors appears to be that one technique is not necessarily better than the other. Each technique has its place in social research. The decision to use one technique over another must be based on the requirements of each individual study. Burton and Cherry (1970) also suggested that whatever the method chosen, it is important that the researcher should recognize the potential for bias which arises from that method's weaknesses.

A decision was made in this study to use a self-administered questionnaire to survey the residents living within the study area. The use of a self-administered questionnaire represented a variation from previous perception studies related to urban lakes (Baxter and Mulamoottil 1981; Debo 1979). The basis for the decision to use a self-administered questionnaire was that, given the limited resources of this study, it permitted a greater number of residents to be included than would have been possible by personally interviewing the residents. Other advantages to the use of the self-administered questionnaire technique included: lack of pressure on respondent for immediate response; avoidance of interviewer bias; and a relative feeling of anonymity by the respondent (Kidder 1981).

The self-administered questionnaire was intended to be completed by one head of the household from each single detached, single attached and duplex dwelling unit located within the study area. In Babbie's (1975) terms, Beaumaris Neighbourhood households were the elements about which the information was collected and which provided the basis of analysis. An attempt was made to study the entire aggregation of households (329) within the study area. To this end, no sampling procedure was utilized.

D. Questionnaire Design

The characteristic weakness of a respondent self-administered questionnaire presented special considerations for the questionnaire design as well as the delivery and collecting procedures. Kidder (1981) suggests that the major weaknesses of self-administered questionnaires are the lack of motivation for the subject to respond, the difficulty of establishing a rapport with the respondent and problems related to misunderstandings regarding complex questions. In the actual questionnaire these weaknesses were addressed through: the provision of clear instructions; an attempt to maintain the interest of the respondent; and an attempt to keep the time required to complete the questionnaire to under fifteen minutes. Specific methods of addressing the inherent weaknesses of this type of instrument will be described in terms of the question mode, wording and order.

Question Mode

The question mode used in the resident questionnaire (Appendix B) was characterized by primarily closed questions in which the respondent selected one or more of the specific categories provided by the researcher (Bailey 1978). The range of possible answers was given and the respondent was asked to circle the number corresponding to his choice. A further refinement to this type of question involved the use of a Likert scale. The Likert scale questions consisted of a series of attitudinal statements for which the respondent was asked to indicate whether he strongly disagreed, disagreed, was neutral, agreed or strongly agreed. The emphasis on this type of question was intended: to focus the respondent on specific issue areas; to minimize the time needed to complete the questionnaire; to facilitate quicker coding of the data; and to allow for the quantitative analysis of the data. Additional open ended questions were intended to allow the respondent to expand on points already covered or to introduce new points which the closed questions failed to address.

Questionnaire Wording

Care was taken in the questionnaire to word the questions and directions clearly and succinctly. Questions generally indicated the scope of the acceptable responses. Both the positive and negative sides to possible answers were included. For the purpose of consistency negative response categories were always listed first, followed by progressively more positive responses. Questionnaire directions were clearly separated from the question by being printed in upper case letters and either being boxed or enclosed within brackets. Special care was taken not to lead or load the attitude statements. The attention paid toward the wording of questions in the questionnaire was intended to increase the reliability and validity of the responses by enabling a uniform and correct interpretation of the questions. Careful wording was also meant to avoid respondent confusion and to minimize the time required to answer the questionnaire.

Ordering and Sequences

Suggestions presented by Bailey (1978) and Kidder (1981) on question ordering were used as a basis for ordering the items within this questionnaire. Major sequences were ordered in the following way: 1) original expectations regarding Beaumaris Lake (Q1 to Q6); 2) actual recreation participation at the Beaumaris Lake site (Q7 to Q9); 3) attitudes towards external factors thought to affect the recreation experience (Q10 to Q23); 4) overall satisfaction (Q24 and Q25); and 5) socio-demographic information (Q26 to Q32). Sequences one and two represent fairly straight forward factual questions. These sequences were arranged in natural chronological order and were intended to establish a comfortable rapport with the respondent. The attitudinal questions which followed required additional reflection by the respondent and were intended to add some interest to the questionnaire. The satisfaction questions were placed to ensure that the respondent had reviewed the positive and negative aspects of the lake in the prior sections. This review was intended to have led the respondent to consider his long term satisfaction rather than only his most recent impression. Finally, the socio-demographic questions were the last sequence because they were anticipated to be the most sensitive. It was hoped that enough rapport would be established with respondents by this point to motivate them to answer these more personal questions. Income did in fact turn out to be sensitive with 42 out of 209 respondents not answering this question. Had this question been placed earlier in the questionnaire a larger number of non-responses to both the questionnaire as a whole and the income question in particular would have resulted.

Questionnaire Pretest

A limited pretest of the questionnaire was performed by administering a draft of the questionnaire to five fellow graduate students associated with the then Department of Recreation Administration. This pretest led to alterations in wording and format. One change that was made in the questionnaire was to box rather than simply underline the directions heading each question sequence. This boxing technique was felt to more effectively highlight the directions. Further alterations resulted from discussions with research advisors. No full scale pretest was performed on a population similar to that of the study area, primarily because a relatively basic questionnaire design had been selected. It was felt that the benefits to be gained from a full scale pretest would not have warranted the resulting costs in terms of time and resources that would have been involved.

E. Data Collection Procedure For The Resident Survey

As with the questionnaire design one of the major purposes of the data collection procedures utilized in this study was to ensure that an adequate response rate was obtained. The following descriptions of the questionnaire delivery and questionnaire collection procedures explain how this purpose was fulfilled.

Questionnaire Delivery Procedures

The delivery of the questionnaire was the first phase of the data collection. This phase was carried out on June 9th and 10th by dropping off a questionnaire package at every occupied single detached and duplex dwelling in the study area. The questionnaire package was dropped into the dwelling mail boxes with no attempt to personally discuss the questionnaire with the residents of the dwelling. The actual delivery of the questionnaire was made between 9:00 a.m. and 4:00 p.m. when many of the residents were away at work.

The questionnaire package contained a copy of the questionnaire (Appendix 2) and a separate covering letter (Appendix C). The format used in this letter largely followed the framework suggested by Dillman (1978).

Both the covering letter and the questionnaire were enclosed in an unsealed 9 inch by 12 inch manila envelope. This envelope was printed with a return address in bold letters stating: The University of Alberta/Edmonton, Alberta, Canada T6G 2E1". The envelopes were also ink stamped with the address "BEAUMARIS LAKE COMMUNITY RESIDENTS".

Operational decisions made during the delivery of the questionnaire package dealt with the identification of unoccupied dwellings and the distinction between lakeview versus non-lakeview dwellings. However, it should be noted that the criteria for these decisions had been established prior to the delivery stage. A questionnaire package was not left at dwellings which were identified as being vacant on the basis of such characteristics as uncompleted construction, lack of curtains or lack of furniture. If there was any question that the dwelling might not be vacant, a questionnaire was left. During the later collection stage if the questionnaire had remained untouched the dwelling was identified as being vacant.

A record also was kept of each household receiving a questionnaire package. This record included spaces for recording the individual questionnaire code, the dwelling address, the questionnaire delivery date and the results of each of the three possible 'call backs'.

Questionnaire Collection Procedures

A series of three call back rounds were performed in an attempt to collect the questionnaires. These call back attempts were made during weekends or the late afternoon and early evening of the weekdays. The purpose of this timing was to call on respondents at a time when they were likely to be at home. The first call back round occured on June 16 and 17. An attempt was made to contact every dwelling which had been left a questionnaire. At dwellings where residents answered the door an inquiry was made about the questionnaire. Completed questionnaires were collected, refusals were recorded, and later collection dates were arranged for individuals who had not completed the questionnaire but were intending to. New questionnaires were given to residents who had lost their original questionnaire but who still expressed interest in participating in the survey. A short notice was left at dwellings where no answer was received explaining that the collection phase of the survey had commenced and stating the approximate date of the next collection attempt (Appendix D). A total of 85 completed questionnaires were received at this stage.

The second call back round commenced on June 18 and finished on June 20. All dwellings which had completed the questionnaire or refused to participate were excluded from this round. Procedures similar to those in the first call back round were used with the exception that no notices were left at dwellings where no personal contact was made. In addition, during the second round of call backs, postage and address labels were given to residents who had been personally contacted in round one and although intending to complete the questionnaire had still not done so. A total of 66 additional questionnaires were collected during this stage.

A third and final call back round was made on June 22. All dwellings which had either completed the survey, indicated that they did not wish to complete the survey, or had indicated that they would mail back the questionnaire were not called upon. The same procedures of personal contact were used as had been used in call back rounds one and two. All residents who had not completed the questionnaire but who indicated that they intended to do so were left a 3 1/2 inch by 6 1/2 inch envelope, ink stamp addressed to the Beaumaris Lake Community Resident and return addressed to The University of Alberta. This envelope contained a short signed notice explaining that a final call back had been made but that the completed questionnaire would still be welcomed by the researcher (Appendix D). The required postage as well as an address label for the mail back of the questionnaire were enclosed. Households at which no verbal contact had been made in the three call back attempts were not left this notice and were treated as non-responses. The third call back round resulted in 33 additional questionnaires being personally collected. An additional 27 questionnaires were received through the mail between June 21 and July 21.

The Response to the Survey

A combined total of 211 questionnaires were collected or received over the three call back rounds and through the mail. Of these questionnaires two were rejected during the coding stage as they were found to be insufficiently complete in that two or more major sections had not been answered. A total of 209 questionnaires were used for the study analysis. The response rate was calculated on the basis of 209 returned useable questionnaires out of a possible 329 occupied dwelling units located within the area. The resulting response rate equalled 63.5 percent.

F. Officials/Experts Interview

The purpose of conducting personal interviews with officials and experts involved with stormwater lakes (Appendix E) was firstly to discover the City of Edmonton's and Genstar Development's original intent for and opinions on Beaumaris Lake. The second purpose of these interviews was to explore the broader issues concerning urban stormwater lakes. The information gained through these interviews served as an extension to the written information discussed in the review of the related research and literature.

G. Treatment of the Data

Processing

The quantitative data resulting from the resident survey were encoded into numerical form through the development and application of a questionnaire coding manual. The numerical data for each completed questionnaire were then recorded on "360 Assembler Coding Forms". From these coding forms the data were entered directly into a computer data file.

Statistical Manipulation of the Data

The quantitative data were analysed at the Computer Science Centre, University of Alberta, utilizing various programs from the Statistical Package for the Social Sciences (SPSS) package. SPSS subprogams utilized included the Subprogram Frequencies and the Subprogram Crosstabs.

Qualitative data collected through the general comment section of the resident survey were edited into precis form. These data were then subjected to latent as opposed to statistical analysis. Relevant comments have been incorporated into the report in support or in contrast to the quantitative analysis.

The techniques of data analysis utilized in this study were neither complex nor sophisticated. Nevertheless, the analysis presented is felt to be appropriate for the investigation of the stated research problem. As Rogers (1969: 103) has noted in regard to land-use studies, ". . . what is needed first is a more mundane analysis of the facts as they exist".

H. Summary and Conclusions

This chapter has attempted to accurately outline and communicate the rationale for the research methodology and techniques used in this study. Particular emphasis was given to the description of the respondent administered questionnaire and to the collection procedures used in the Beaumaris resident survey component of the study. It was recognized that the methodology and techniques used represent only one of the several feasible approaches to the study. However, it was felt that the methodology and techniques chosen represented the optimal choice given the nature of the problem and the limited resources available to the researcher. Methodological decisions related to the study area were also briefly outlined in this chapter. Given this discussion as a base, Chapter IV provides a more detailed description of the Beaumaris Lake study area.

IV. THE BEAUMARIS LAKE SETTING

A. Introduction

The intent of this chapter is to provide an accurate description of Beaumaris Lake and the Beaumaris neighbourhood setting. In providing this description, succeeding chapters dealing with the resident survey analysis will be able to be interpreted within the situational context of the lake. In addition, subproblem one of the study will be addressed by identifying the city government's and the developer's intent for and incorporation of recreation opportunities into the Beaumaris Lake setting.

The format to be followed in this chapter will start with a review of the historical development of Beaumaris Lake. Secondly, the lake setting will be described on the basis of its: physical, biological, social and managerial components. Finally, the social-demographic profile of the study area as identified in recent census data will be reviewed and compared to the socio-demographic data gathered in the survey.

B. The History of Beaumaris Lake

The Genstar Development Company assembled the land for what is now Castle Downs in 1968-69. At that time all of the land fell outside of the northern boundaries of the City of Edmonton. Genstar made this purchase with the realization that stormwater drainage for this area was going to present an obstacle which would have to be overcome before development could proceed (Chalcroft 1979).

In 1969 Genstar commissioned the UMA Group to carry out a study identifying feasible methods of providing storm drainage for the area. This study suggested that the following alternatives were available to Genstar:

1. a major trunk along 153rd avenue to the North Saskatchewan River - 6 miles - estimated cost of $6.7 million.
2. a major trunk west to Big Lake on the Sturgeon River - estimated cost $7.2 million.
3. a storm regulating lake within the subdivision and a controlled outlet to the existing 137th avenue trunk - estimated cost $2.5 million.

Chalcroft 1979:3

On the basis of the economic rationale of option three and with the support of technical arguments addressing feasibility, Genstar successfuly lobbied the City of Edmonton to annex this land in 1971.

In 1971 UMA carried out a more detailed study of the Beaumaris Lake proposal which addressed technical concerns such as water quality and soil types. This study enabled Genstar to successfully negotiate a Development Agreement with the City of Edmonton for Beaumaris Neighbourhood (Chalcroft 1979). A final pre-development study was undertaken in 1976 which determined the required design specifications of the lake for adequate stormwater management. Information gained from this study was used to identify the freeboard area required to surround the normal water level of the lake in order to to ensure that no undue flood damage occurred during storm periods.

The City of Edmonton's role in the development of Beaumaris was restricted to commenting on and reviewing Genstar's plans. City reviewers were limited as were the developers themselves by their inexperience with stormwater lakes (Braj Prasad 1983: pers. comm.).

The actual excavation of Beaumaris Lake began in May 1977 and was completed in October 1978 (Genstar Development Fact Sheet, n.d.). Residential construction occurred concurrently and following the excavation of the lake. At the present time there remains approximately 37.0 percent of the study area undeveloped (Edmonton Planning Department, 1983).

C. The Recreational Setting of Beaumaris Lake

As with any recreational setting the Beaumaris Lake site may be thought of in terms of its component parts (Clark and Stankey 1979). The four component parts discussed in this section are the physical, biological, social and managerial components.

The **physical design** of the lake was based firstly on the requirements of the stormwater management function and secondly on an attempt to achieve aesthetic and recreational goals. The representative from Genstar stated that "The lake could have taken a number of configurations but we actually planned the lake to utilize the maximum potential for recreation . . . That is the reason we have the walkways, lookouts and all the other (recreational) features" (Dixon 1983: pers. comm.). In an attempt to meet these objectives Genstar developed Beaumaris along a Middle Ages fortress theme and attempted to reflect some of the character of the Welsh castle of the same name. In keeping with this theme the lake was given a "hard edge" treatment of concrete cast walls.

One of the intended effects of this treatment was to provide the impression of a moat with the surrounding castle fortifications and lookouts.

The stormwater management, aesthetic, and recreational functions were all addressed and incorporated into the actual design of the lake. The normal size of the lake, at 34 acres with a storage capacity of 68.3 million gallons, provides a good example of the attempt to incorporate multiple functions into the design (Genstar Development Fact Sheet, n.d. and Genstar Development Brochure, n.d.). These size dimensions were primarily based on existing site characteristics and stormwater management objectives. The relatively large size was also thought to contribute to the potential of Beaumaris Lake for recreational uses such as canoeing (Card 1983, pers. comm.). A second important design feature is the shape of the lake as shown in Figure 1.1. This shape results from the predevelopment topographical characteristics of the site in conjunction with the "medieval theme" chosen for the area. Thirdly, Beaumaris Lake varies from eight feet to eleven feet in depth while at normal water level (Genstar Development Fact Sheet, n.d.). The lake depth was also determined on the basis of the topographic features of the site. In addition, consideration was given to the minimum lake depths needed to reduce water quality problems. A fourth design feature of the lake concerns the side slopes which vary from 3:1 to 7:1 above the normal water line and are 7:1 below the normal water line. These slopes were designed to maximizing water storage capacity in terms of area but were balanced with safety considerations. In addition to the gently sloped underwater slopes, rock or "rip rap" was used as a shoreline treatment for safety reasons. "The intent of . . . [this] . . . shore treatment . . . [was] . . . to discourage people from entering the water, but if it should happen, to provide a safe, shallow bottom from which it should be possible to extricate oneself" (Chalcroft 1979).

The features mentioned to this point serve important stormwater management functions as well as having important recreational and aesthetic impacts. The following landscape design features are almost solely intended to serve recreational and aesthetic functions. These features include: bicycle/pedestrian trails, viewpoints at strategic locations around the lake, ornamental lighting, well-planned shrubbery, flower gardens and tree plantings, wooden decks at lake side, and a boat ramp (Chalcroft 1979). The presence of these features provides evidence that a significant recreational function was intended for and has been incorporated into the physical component of the Beaumaris Lake setting.

The primary characteristic of the **biological component** of the setting is water quality. Both Genstar and the City of Edmonton realized that there were going to be limitations on water quality due to the primary purpose of Beaumaris Lake being storm-water management. Given this limitation, primary water-based recreation activities such as swimming and wading were ruled out as permissable forms of recreation at the lake from the beginning. The intention of the City of Edmonton for recreation at stormwater lakes was that ". . . stormwater lakes be utilized for secondary and tertiary recreation purposes and that the water quality necessary to maintain this level of recreational use be ensured" (Edmonton Parks and Recreation 1980: 12).

Genstar feels that the current water quality of Beaumaris Lake meets the requirements for secondary and tertiary water based recreation activities. They feel that ". . . the water quality is as good as the North Saskatchewan River . . . (and that) surface sport should be allowed" (Dixon 1983: pers. comm.). City of Edmonton representatives express a more negative impression of the water quality of Beaumaris Lake. City officials point out that the very nature of storm draining from an urban area is of poor water quality. In addition, although the water quality may be relatively safe for secondary recreation contact one moment, it may change substantially for the worse shortly thereafter due to such things as chemical spills entering the lake. Water quality also may change quickly during a heavy rainfall due to normal pollutants contained in the runoff and due to the stirring up of pollutants previously settled to the bottom of the lake. The point is that it is impossible to control the quality of the effluent entering the lake (Clark 1983: pers. comm.).

City officials indicated that the water at Beaumaris Lake is characterized by an exceptionally high level of faecal coliforms. The presence of this form of pollution is primarily due to a number of accidental cross-connections between the storm and sewage drainage systems at the individual dwelling level. The result of these cross-connections has been that raw sewage has been entering the lake (Spacek, Clark, Prasad, Card 1983: pers. comm.). This problem has been recognized and publicized in Edmonton newspapers. Examples of these articles include: "Pennifold Attacks Approval of lake in

Castle Downs" (Edmonton Journal, 1980) and "Tainted lake" (Edmonton Sun, 1980). In both these instances the problem of cross-connections in the drainage system was discussed.

The City of Edmonton has been attempting to improve the water quality of Beaumaris Lake through both special and regular operational procedures. Edmonton Water and Sanitation is currently trying to trace the sewer line cross-connections and see that proper repairs are made (Spacek 1983: pers. comm.). In addition, regular maintenance has included "copper sulfate" treatments which are intended to reduce weed and algae problems. Agreement on the benefits of such maintenance procedures is not unanimous as Bryce Card (1983: pers. comm.) states that ". . . the chemical treatment is almost worse than leaving like it is. You can kill the weeds but the water is still dangerous."

As a general impression city officials feel that while the water quality of Beaumaris Lake has improved over the past few years it continues to be relatively poor.

> Until such time as moneys are available to treat the water to a high degree and until such time as some of the other problems are eliminated such as cross-connected sewer systems, the probability [that the water quality will signficantly improve] is small.
>
> Clark 1983: pers. comm.

The City administrators perception of poor water quality at Beaumaris Lake has had a strong effect on the recreation setting of the site. Not only has the City refused to actively sponsor any water-based recreational programming at the lake, they also posted the lake for no boating during the Spring of 1983 because they felt the water quality was too poor.

The two main characteristics that make up the **social component** of the Beaumaris Lake recreation setting include community identity and access. These characteristics will first be reviewed in terms of the developer's and the City's original intention and then secondly, the existing incorporation of these characteristics at the lake setting will be reviewed.

The Beaumaris Neighbourhood community identity was intended to be promoted through the use of the lake ". . . as a focal point for central area development" (Reid, Crowther and Partners Limited 1970). This focal point was emphasized by locating a shopping and commercial area known as the 'Town Centre' by the lake. Evidence of the intent to promote a community identity is provided in the Genstar promotion brochure which stated that: "The 'Town Centre' in conjunction with the amenity of "Beaumaris Lake" offers residents the opportunity to live and shop in an environment unique to the Beaumaris neighbourhood" (Genstar Development Brochure, n.d.).

As the second characteristic of the social setting, access to Beaumaris Lake was intended to be open to the general public. The rationale given for open access was that the lake was a public utility and therefore all Edmonton citizens should have access to it (Clark 1983: pers. comm.). Site planning and design were based on the anticipated attractiveness of the lake to residents from the surrounding district and region as well as the local community (Dixon 1983: pers. comm.).

The existing lake setting provides evidence of the incorporation of the developer's and City's stated intentions in terms of the social component of the recreation setting. The Beaumaris community identity has been reinforced by border fencing along major portions of Castledowns Road and Beaumaris Road. This community identity is also strengthened by the presence of the 'Town Centre' and its water gardens located on the southwest corner of the lake.

The intention to allow unrestricted public access to the lake site has been ensured by designating a strip of park land which surrounds the entire circumference of the lake (Figure 1.1). Public walkways at several locations provide access to this park land. Although not actively promoted as a city wide park, access is in no way restricted to only Beaumaris Neighbourhood residents.

One social problem which was not fully anticipated by the developer or by the City was vandalism. Both Genstar and the City of Edmonton now recognize that vandalism has been a problem at the Beaumaris Lake site. One indication of the extent of the problem has been the removal of the lockstone used for paving the lookout points and its subsequent deposit into the lake. John Dixon (1983: pers. comm.) commenting on the extent of this problem stated that there has been almost enough lockstone thrown into the water ". . . to pave the bottom of the lake."

The characteristics of a strong community identity, open public access, and vandalism problems all make up the social component of the recreation setting of Beaumaris Lake. All of these characteristics parallel the original intentions of the developer and the City with the exception of the vandalism problem.

The forth and last component of the recreation setting to be examined is the **managerial component.** This component has been divided into the general approach to management and regulation, management directly related to safety and management related to operation and maintenance. These characteristics of the management component will be discussed firstly in terms of the intentions expressed by Genstar and the City, and secondly in terms of the existing situation.

Genstar and the City appear to have had similar intentions regarding the general policy of management at Beaumaris Lake. In both instances it was clearly recognized that stormwater management was the primary purpose followed by important secondary functions related to recreation and aesthetics. These intentions were clearly identified in the North Edmonton Outline Plan (Reid, Crowther & Partners Limited 1970:37) which stated "Although the fundamental purpose of the lake is to retain rain water runoff due to the limited capacity of the City system in this area a secondary but important feature is its potential as a park, recreation and scenic element in the design". Similarily, Genstar (Development Fact Sheet, n.d.) has stated that the lake is intended ". . . primarily to regulate stormwater runoff, and has been significantly improved to elevate the aesthetics and amenity of the community". Given these stated intentions, actual management policies have been formulated with this functional priority ranking in mind.

Safety issues represent the second characteristic of the managerial component of the setting. All developer and City representatives interviewed recognized that the danger of accidental drowning was very real. However one interviewee suggested that if the risks to life within the subdivision were categorized and ranked, the lake would probably be right near the bottom, following sites like arterial roads and road crossings (Dixon 1983: pers. comm.). The general concensus was that the developer and the City must do everything that they ". . . can to alert the people that there is a danger" (Card 1983: pers. comm.). Beyond this point some responsibility must be shifted to the residents. The lake requires common sense and presents risks similar to those of any other water feature in a residential area.

Genstar Development was responsible for the operation and maintenance of the Beaumaris Lake site for the first three years after its construction under the Standard

Residential Servicing Agreement (Edmonton Parks and Recreation 1980). Currently operation and maintenance at the lake site, which relates directly to the stormwater function, is the responsibility of Edmonton Water and Sanitation. Edmonton Parks and Recreation is in turn responsible for operation and maintenance required to meet the residential and aesthetic functions over and above that required to meet the stormwater management functions.

The actual status of the management component of the lake setting reveals some differences between the developer and the City and between the original intentions and reality. Genstar has remained very supportive of policy and regulations which would permit a full range of tertiary and secondary recreation activities to occur at the site. They feel that the water quality is sufficient to enable activities such as boating to occur (Dixon 1983: pers. comm.). However Genstar has no current authority to implement policy or regulations and is in the enviable position of being able to suggest to the residents ". . . what they can do [while] . . . the City tells them what they can not do" (Dixon 1983: pers. comm.).

The City appears to have reversed its original intention to permit and encourage secondary water based recreation. One official explained this change by stating that: ". . . on the basis of the [low] water quality we have determined neither to conduct any recreation programming or to sanction any water based recreational activities on the lake" (Clark 1983: pers. comm.). Another official stated that there ". . . is no point in allowing people to go in [to the water] and get sick" (Prasad 1983: pers. comm.).

In keeping with the original intention to make the lake site as safe as possible given its inherent dangers as a water feature, the developer and the City have addressed safety through design features and management policy. Safety features built into the design include a rip rap shore line, low grade slopes and submerged inlets and outlets. All of these features are designed to discourage people, especially children, from entering the water and to aid in a safe exit from the water if someone does fall in.

Management action has included posting warning signs regarding poor ice conditions and no swimming regulations and recently no boating regulations (Clark 1983: pers. comm.). Brochures (Edmonton, City of, n.d.) are also used to educate the public about the dangers and functions of Beaumaris Lake. In the first few years of development

Genstar also sent letters to the community schools warning them of dangerous ice conditions (Dixon 1983: pers. comm.). All of these management actions have been taken in an attempt to educate the surrounding commuity of the dangers of the lake site.

Edmonton Water and Sanitation is currently performing the operation and maintenance responsibilities relating to the stormwater management function of Beaumaris Lake. Its 1983 activities included water quality sampling, copper sulfate treatments, changing warning signs, and removing debris from the lake (Edmonton Water and Sanitation 1983). Edmonton Parks and Recreation has been maintaining the lake side park land in a manner similar to its maintenance of other city parks. No significant problems pertaining to the division of operation and maintenance responsibilities were expressed by either City department. Both departments did, however, recognize that acts of vandalism created difficulties for site maintenance.

The management component of the Beaumaris Lake setting has its strongest impact on the recreation function of the lake in that all primary water based activities are prohibited as are some secondary water based activities such as boating. Operation and maintenance agreements appear to be functioning adequately from the perspective of the City. The City does, however, recognize that acts of vandalism have had a negative impact on the recreation setting.

D. Beaumaris Neighbourhood Socio-demographic Summary

The intent of this section is to highlight the socio-demographic composition of Beaumaris Neighbourhood as identified in the 1981 Census of Canada and the 1983 Edmonton Civic Census. These characteristics will then be compared to the socio-demographic data collected in the Beaumaris Neighbourhood resident survey with the purpose of assessing the representativeness of the respondents in regards to the population being surveyed (Table 4.1).

The 1983 Civic Census of Edmonton contains the most up to date census data available on the Beaumaris study area. The figures used in this report are listed under the Civic Census tract 78.05, area four. This tract covers an area identical to that of the study survey with the exception of approximately six additional dwellings in the southeast corner. The 1981 Canada Census figures are not only older but include the

TABLE 4.1

BEAUMARIS NEIGHBORHOOD SOCIO-DEMOGRAPHIC PROFILE

CHARACTERISTICS	CENSUS	STUDY RESPONDENTS
Sex	males (602) 49.4%* females (617) 50.6%*	males (106) 51.7% females (99) 48.3%
Age distribution	only 17.0% over 45 years*	only 18.0% over 45 years
Marital Status	single (594) 48.9%* married (572) 47.1%* other (49) 4.0%*	
Average number of persons per private household	3.4**	3.45
Tenancy	resident owners (236) 65.5%*	resident owners (168) 82.0%
Proportion of single detached dwellings	40.0%***	81.0%
Length of residence		up to 1 year (52) 25.1% 1 to 2 years (54) 26.1% 2 to 3 years (59) 28.5% over 3 years (42) 20.3%
Education		68.3% greater than high school
Annual household income		70.2% greater than 40,000

Source: * Edmonton Planning Deparmtent 1983 b:Civic Census
** Statistics Canada 1982:1981 Census of Canada
*** Edmonton Planning Department

neighbourhoods lying to the north and to the east of Beaumaris Neighbourhood. This information is useful, however, in that some socio-demographic characteristics are included which have not been included in the Civic Census. To overcome the problem of the greater area involved, the Census of Canada data are examined in terms of averages and ratios with the realization that these figures represent estimations only.

The total population of the study area is listed by the Civic Census as 1,219 with 602 of those being males and 617 being female. When this population is broken down into five year age categories a fairly even distribution of between seven and thirteen percent is revealed for each category up to the age of forty-four. Past this point the five year age categories contain substantially fewer members. Less than seventeen percent of the total population is forty-five or older. A similar trend is revealed in the Census of Canada records which show a relatively low proportion of residents over the age of forty-five years.

The Civic Census records 594 single residents, 572 married residents, and forty-three residents listed as "other" in terms of marital status. The forty-three residents recorded as "other" include widowed, divorced, and separated individuals. Singles include young children. The Census of Canada records the average number of persons per private household as being 3.4. With marital status and average household memberships both taken into account, the study area appears to be characterized by married couples with one or two children.

Out of a total of 366 occupied dwellings the Civic Census lists 130 or 35.5 percent as being rented and 236 or 64.5 percent as being owned by their inhabitants. Single family dwellings make up approximately 40.0 percent while other multiple unit types of dwellings make up approximately 60.0 percent of the total housing in the area. This housing classification breakdown was listed in the Edmonton Planning Department Neighbourhood Fact Sheet for the Beaumaris area which includes a neighbourhood to the east of the study area. Through on-site observation and an examination of land use maps it appears that the figures presented in the Neighbourhood Fact Sheet may slightly overestimate the proportion of multiple dwelling units and slightly underestimate the proportion of single detached family units in the actual study area.

The Beaumaris resident survey carried out in this study collected data on some of these same factors. Comparison between the survey data and the census figures reveal some strong similarities and a few notable differences.

A total of 721 residents were identified in the survey data compared to 1219 residents in the civic census. This difference was expected due to the 63.5 percent response rate received in the survey. In terms of sex, 106 or 51.7 percent of the respondents to the survey were male compared to 99 or 48.3 percent female. These proportions compare favourably to the Civic Census data of 49.4 percent males and 50.6

percent females, although males appear to be slightly over represented in the study. Not withstanding that different age categories were used in the study questionnaires than in the Civic Census or Canada Census, a similar pattern emerges. The majority of the household members indicated in the survey data are fairly evenly distributed up to the forty-five year age point (Table 4.2). Only 18.0 percent of the household members listed in the survey fell in the over forty-five categories with very few senior citizens indicated at all. Similarities also occured in terms of average household membership. A total of 3.45 household members on average were indicated in the survey data which was only slightly higher than the 3.4 average recorded in the Canada Census.

Noteworthy differences between survey data and census data occured in terms of dwelling tenure and dwelling classification. The survey data indicated a higher proportion of home owner respondents at 82.0 percent than the Civic Census showed as actually existing in the area at 64.5 percent. One reason for this difference was the decision not to survey apartment buildings, which included renters recorded in the Census figures. There was one such apartment building which was located in the southeast corner of the study area.

The survey data also showed that 81.0 percent of the respondents lived in single detached dwellings which was considerably higher than 40.0 percent recorded in the Beaumaris Neighbourhood Fact Sheet. This difference can also partially be explained on the basis of apartment buildings being excluded from the study. Nevertheless, survey respondents do appear to be over represented by single detached dwellings and home owners in comparison to census figures for the area. The over representation of these groups appears logical given that their characteristics are closely related and that home owners having made a greater investment in the area may therefore have been more motivated to respond to the survey.

Additional socio-demographic characteristics collected through the survey but not included in the census information dealt with length of residence in the area, education of respondent and household income. Respondents indicated that they had lived in the neighbourhood for four years or less. An even distribution was indicated for respondents recording a residence of less than one year, one to two years, two to three years and three to four years. The data showed that 68.3 percent of all respondents had at least

TABLE 4.2

AGE DISTRIBUTION BY LAKEVIEW AND NON-LAKEVIEW POPULATIONS

	LOCATION					
AGE DISTRIBUTION	Lakeview		Non-lakeview		Total	
	n	%	n	%	n	%
Under 5	(18)	10.2	(70)	12.9	(88)	12.2
5 to 13	(26)	14.7	(81)	14.9	(107)	14.7
14 to 18	(15)	8.5	(46)	8.5	(61)	8.5
19 to 24	(22)	12.4	(48)	8.8	(70)	9.7
25 to 44	(53)	29.9	(215)	39.5	(268)	37.2
45 to 64	(42)	23.7	(73)	13.4	(115)	16.0
Over 65	(1)	0.6	(11)	2.0	(12)	1.7
Total	(177)	100.0	(544)	100.0	(721)	100.0
Average household size	177÷53=3.34		544÷156=3.49		721÷204=3.45	

some level of education beyond high school graduation. Finally, 70.2 percent of the respondents indicated that their household income was greater than $40,000 annually.

E. Summary and Conclusions

Due to the fact that Beaumaris Lake was the first stormwater lake constructed in Edmonton, a considerable amount of planning had to preceed its development. The Genstar Development Company was involved in this planning and design process for approximately ten years before the excavation of the lake was completed in 1978. During this time various City of Edmonton Departments were involved in the development review process to ensure that their interests were met in the Beaumaris development.

Both Genstar and the City had major effects on the four components of the Beaumaris Lake recreation setting. Athough the primary function of the lake was identified as stormwater management secondary recreation functions were intended to be provided. Toward this end, recreation amenities such as parkland, walkways, docks and boat ramps were included in the physical design of the site. In terms of the biological component of the setting, water quality was intended to be sufficient to permit secondary types of water based recreation. Although Genstar feels that the water quality is presently adequate, City officials feel that it is not sufficient to permit secondary activities such as boating. The developer and the City appear to have successfuly met their social component objectives of promoting a community identity through the lake and providing public access to the lake. Vandalism is a social problem which has affected the recreation setting of Beaumaris Lake much more than either the developer or the City had anticipated. The management component of the site has seen a shift towards more restrictive regulations than those originally intended by Genstar or the City. This shift has occured primarily as a result of concerns about safety and water quality by the City. With the exception of the vandalism problem, neither the City nor Genstar perceive a major problem with the operation or maintenance of the setting.

It is obvious in examining these components of the Beaumaris Lake setting that both the developer and the City intended and tried to incorporate a recreation function into this setting. It is also evident that the City is reducing its support of the recreation function mainly due to its concern with the poor water quality of the lake.

In very general terms the socio-demographic characteristics of the Beaumaris Neighbourhood study area can be described as being predominantly: residents of middle aged or younger; married couples with one or two children; residence owners rather than renters whose length of residence has been four years or less. The respondents who returned the study questionnaires appear to be representative of this population with the exception that a greater proportion of them own their residence and live in single detached dwellings.

This chapter has outlined the original intention for and attempt to incorporate a recreation function into the Beaumaris Lake setting by the developers and by the City. A description of the socio-demographic characteristics of the surrounding neighbourhood was also provided. Chapter V will now turn to the residents of the Beaumaris Neighbourhood in order to examine the recreation function of Beaumaris Lake from their perspective.

V. ORIGINAL RESIDENT EXPECTATIONS FOR AND ACTUAL USE OF BEAUMARIS LAKE AS A RECREATION SETTING

A. Introduction

An evaluation of the recreation function of Beaumaris Lake requires that the residents of the Beaumaris neighbourhood be consulted. The first purpose of this chapter is to investigate the expectations of local residents towards the lake setting when they originally moved to the Beaumaris Neighbourhood. The second purpose is to investigate the residents' actual use of the lake site for recreation.

In addition to these purposes differences between lakeview and non-lakeview residents will be identified regarding their socio-demographic characteristics, their original expectations, and their use of the site for recreation. Significant differences are expected between locational groups due to the existing cost differential in housing. This cost differential in housing is reflected in the lot purchase prices. The purchase price of lots backing on to the Beaumaris Lake park area have been consistently higher at any given time than the purchase price of lots which are removed from the lake area (Dixon 1984 pers. comm.). A typical cost difference is illustrated by the following example of lot sales which occurred on the east side of the Beaumaris Keep during the summer of 1983. During this period, the cash sale of one lakeview lot was $49,875. Located just across the street a slightly smaller lot which did not have a lakeview was sold for $39,900 cash. Similar comparisons between other lakeview and non-lakeview lots revealed a consistent pattern of a 15 to 20 percent additional cost for lakeview lots. The lakeview lot premium was charged because a lakeview lot was perceived by Genstar as possessing extra value in terms of increased privacy and aesthetics. The exact cost differential due to the perceived locational value involved relatively subjective decisions by Genstar. However, since these lots were sold on the open market their price is felt to reflect the true market value of the property. Consequently, the question is raised that since lakeview residents were willing to pay more for their housing do they also perceive the lake differently than non-lakeview residents.

In this analysis, statistically significant relationships will be defined as those with a chi-square probability level of 0.1 or less. The decision to use a probability level of 0.1

was made based on the fact that potentially important differences would not be identified at more stringent levels of probability due to the relatively low number of questionnaires (209) being analysed. It is recognized that the significant differences identified in this study will merit special attention in future stormwater lake studies which feature more rigorous requirements for significance.

B. Locational Differences Between Socio-demographic Data

A brief description of the socio-demographic characteristics of the respondents has already been provided in the preceding chapter. The intent of this section is to analyse the socio-demographic data in order to identify differences between lakeview (LV) and non-lakeview (NLV) respondents.

With the exception of the length of residence question all of the socio-demographic questions were placed at the end of the questionnaire, running from Q26 through to Q32. The placement of these questions was intended to permit the establishment of a rapport with the respondent prior to his/her being asked these personal questions. The fact that only a few of the returned questionnaires omitted these questions indicated that this procedure was successful. The one possible exception to this response was Q32 regarding household income of which 41 out of a total of 209 respondents chose not to answer.

Four socio-demographic characteristics were found to vary significantly between LV and NLV respondents. These characteristics included: income level, length of residence, age of respondent, and the sex of the respondent. Lakeview respondents indicated that their income level was relatively higher than that indicated by NLV respondents (Table 5.1). While over more than one half of the LV respondents reported annual total household income to be greater than $40,000 less than one quarter of the LV residents reported being in a similar income bracket. Although these differences were found to be statistically significant, the considerable number of non-responses for this question raises the issue of its representiveness. Nevertheless, the locational difference indicated by the data is logical given that higher incomes for LV respondents would enable them to purchase or rent their more expensive dwellings.

TABLE 5.1

HOUSEHOLD INCOME DISTRIBUTION ON THE BASIS OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

	LOCATION		
HOUSEHOLD INCOME LEVELS	Lakeview %	Non-lakeview %	Total %
Less than $40,000	14.3	34.9	29.8
$40,000 to $60,000	28.6	42.9	39.3
$60,001 to $80,000	33.3	15.9	20.2
$80,001 and over	23.8	6.3	10.7
TOTAL	(42) 100.00	(126) 100.0	(168) 100.00

Chi-square = 19.85; d.f. = 3; p<0.0002

Non-lakeview respondents indicated that they had resided in their present residence for a longer period of time than did LV respondents (Table 5.2). Whereas over 55.0 percent of the NLV respondents had lived in their residence for over two years, less than 30.0 percent of the LV respondents indicated the same length of occupancy. The reason for this variation is that Genstar chose to complete the primary lakeview areas as the later phases of their Beaumaris Neighbourhood development. The rationale given for selecting this order of phasing was twofold. Firstly, Genstar felt that servicing costs would be reduced through this order of development. Secondly, Genstar felt that the lakeveiw lots would be more effectively marketed if the rest of the neighbourhood was already in place (Dixon 1984: pers. comm.).

A third significant difference between LV and NLV respondents was identified related to age, in that lakeview respondents tended to be older than NLV respondents (Table 5.3). A total of 42.0 percent of the LV respondents were forty-six years or older while only 21.8 percent of the NLV fell in the same category. The tendency for LV

TABLE 5.2

LENGTH OF RESIDENCE ON THE BASIS OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

LENGTH OF RESIDENCE	LOCATION Lakeview %	 Non-lakeview %	 Total %
Up to 1 Year	38.5	20.6	25.1
Over 1 Year up 2 Years	34.6	23.2	26.1
Over 2 Up to 3 Years	9.6	34.8	28.5
Over 3 Years	17.3	21.4	20.3
TOTAL	(52) 100.0	(155) 100.00	(207) 100.0

Chi-square = 15.85; d.f. = 3, $p<0.0012$

respondents to be older may be related to the higher cost of LV housing. Increased housing costs suggests that greater financial resources and stability are required which may normally be associated with older, more established heads of households.

The final socio-demographic characteristic that differed between locations to a significant degree was the sex of the respondent. A higher proportion of males (64.0 percent) responded to the survey from the LV group than did males from the NLV group (47.7 percent) (Table 5.4). The tendency for more males to respond as the head of the household in the LV group may have been due to the more traditional sex roles which correspond to the older age bracket that LV respondents fall into. Lakeview households may have tended to identify the male as the real head of houeholds in keeping with these traditional sex roles.

No significant differences were found between LV and NLV respondents in terms of dwelling ownership or education. It was found that 82.0 percent of the resondents owned their own dwelling, and that 68.3 percent had taken some type of formal education beyond high school. It was also found that there were no differences between locational

TABLE 5.3

AGE DISTRIBUTION OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

AGE	LOCATION Lakeview %	 Non-lakeview %	 Total %
Up to 35 Years	34.0	47.7	44.3
36 to 45 Years	24.0	30.5	28.8
46 to 55 Years	28.0	13.9	17.4
55 Years and Over	14.0	7.9	9.5
TOTAL	(50) 100.0	(151) 100.0	(201) 100.0

Chi-square = 7.87; d.f. = 3; $p<0.0487$

TABLE 5.4

SEX DISTRIBUTION BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

SEX	LOCATION Lakeview %	 Non-lakeview %	 Total %
Female	36.0	52.3	48.3
Male	64.0	47.7	51.7
TOTAL	(50) 100.0	(155) 100.0	(205) 100.0

Corrected Chi-square = 3.38; d.f. = 1; $p<0.07$

groups regarding housing type with approximately 81.0 percent of both groups indicating that they resided in single family detached dwellings.

C. Original Expectations of the Beaumaris Neighbourhood Residents Towards Beaumaris Lake

The second subproblem of the study is addressed in this section. This subproblem was to identify the initially anticipated recreation opportunities of households in the Beaumaris neighbourhood. In addressing this subproblem the data collected from Q2 through to Q6 of the questionnaire were analysed.

The data for this section were collected and analysed with the realization that some of the respondents may not have accurately reported their original expectations because they may have forgotten them (Hindley 1979). It was felt, however, that the importance of a dwelling purchase or decision to rent in a certain area would have been a major decision for the respondents. The significance of this decision and the fact that it would have been made within the past five years suggested that these expectations would still be fresh in the respondents' minds. The analysis of this data is therefore felt to be a relatively accurate assessment of the respondents' expectations.

A total of 29.0 percent of all respondents indicate that the presence of Beaumaris Lake was a very important factor in their decision to take up residence in the neighbourhood (Table 5.5). In addition 45.9 percent of the respondents stated that the presence of the lake was somewhat important in their decision to locate in the neighbourhood. The presence of the lake was also a more important factor for lakeview residents than non-lakeview residents. This significant difference is evident in that 53.7 percent of the LV respondents felt that the presence of the lake was very important in their decision to locate at their present residence while only 19.4 percent of the NLV respondents felt the same way. The fact that LV respondents tended to rate the presence of the lake as a more important factor in moving to their residence than did NLV respondents is logical as LV respondents paid a premium for the privilege of being next to the lake. Lakeview residents are also in greater visual contact with the lake so may have considered the consequences of the lake more carefully than NLV respondents prior to moving to the area. This finding parallels that of Debo (1977) and Baxter and Mulamootil (1981) who found that home owners located closer to the lake strongly indicated that the lake was an important factor in their decision to purchase while home owners further from the lake rated the lake as less important. Debo (1977) also suggested that the provision of public access to the lake increased the importance of the lake as a purchase factor to non-lake shore homeowners. The presence of public access to Beaumaris Lake would therefore explain why NLV respondents identified the presence of Beaumaris Lake as a significant although somewhat less important factor than did LV respondents in their decision to locate their residence in the neighbourhood.

In terms of their original awareness of the stormwater management function of Beaumaris Lake a total of 68.4 percent of all respondents indicated that they were aware of the function when they originally moved to their residence (Table 5.6). This proportion was substantially higher than that found by Baxter and Mulamoottil (1981) who recorded only a 30.0 percent awareness of the stormwater management function in their study.

Lakeview respondents tended to be more initially aware of the stormwater function of the lake (80.4 percent) than NLV respondents (64.5 percent). The greater awareness expressed by the LV residents is reasonable considering the larger housing investment which they made and in terms of the greater importance that they attached to

TABLE 5.5

IMPORTANCE OF BEAUMARIS LAKE IN DECISION TO MOVE TO THE NEIGHBOURHOOD ON THE BASIS OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

DEGREE OF IMPORTANCE	LOCATION		
	Lakeview	Non-lakeview	Total
	%	%	%
Not At All or Not Too Important	13.5	29.0	25.1
Somewhat Important	28.8	51.6	45.9
Very Important	57.7	19.4	29.0
TOTAL	(52) 100.0	(155) 100.0	(207) 100.0

Chi-square = 27.90; d.f. = 2, p<.0000

TABLE 5.6

ORIGINAL AWARENESS OF STORMWATER FUNCTION BY LAKEVIEW AND NON-LAKEVIEW RESIDENTS

	LOCATION		
ORIGINAL AWARENESS OF STORMWATER FUNCTION	Lakeview %	Non-lakeview %	Total %
No	19.6	35.5	31.6
Yes	80.4	64.5	68.4
TOTAL	(51)100.0	(155)100.0	(206)100.0

Chi-square = 3.77; d.f. = 1; p<.052

the presence of the lake in their original decision to locate in their residence.

In response to Q4 which asked whether the respondent was initially aware of any possible use of Beaumaris Lake or the land surrounding it for recreation, over two-thirds of the respondents (69.0 percent) expected some form of recreational activities to be available to them at the lake site.

All the respondents who did have expectations regarding recreation were asked to list up to three sources for these expectations. Table 5.7 lists these sources in their overall rank order. Real estate agents and media sources were the first and second most frequently mentioned sources at 24.2 and 17.9 percent respectively. Area residents, developer / builder, friends wth urban lake experience and personal urban lake experience followed as original sources, ranging from 12.1 percent down to 4.7 percent. The relatively large category for 'other" sources at 28.9 percent includes responses labelled "no source in particular" and entries such as "saw the lake being developed" and "I am involved in sewer design as my occupation". These responses were not readily codable into significant source groups, but do not appear to be influenced by the developer.

It appears from this ranking that conscious development sponsored sales promotions were the primary sources of recreation expectations from the list provided,

TABLE 5.7

SOURCE OF RECREATION EXPECTATIONS BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

	LOCATION					
SOURCE	Lakeview		Non-lakeview		Total	
	(n)	%	(n)	%	(n)	%
Real Estate Agent	(6)	13.3	(40)	27.6	(46)	24.2
Media	(7)	15.6	(27)	18.6	(34)	17.9
Area Residents	(6)	13.3	(17)	11.7	(23)	12.1
Developer Builder	(4)	8.9	(8)	5.5	(12)	6.4
Friends With Urban Lake Experience	(2)	4.4	(9)	6.2	(11)	5.8
Personal Urban Lake Experience	(4)	8.9	(5)	3.5	(9)	4.7
Other*	(16)	35.6	(39)	26.9	(55)	28.9
TOTAL	(45)	100.0	(145)	100.0	(190)**	100.0

Notes:
*Other
- includes response category "No source in particular"
- saw the lake being developed etc.
** This figure equals the total number of responses not respondents, as up to three separate sources per respondent were recorded.

while more informal sources such as personal experiences were ranked lower. However, it should be noted that if these sources were to be collapsed into developer influenced sources and non-developer influenced sources a fairly even split would result. The reason for this even split is that the "other" category appears to be made up of primarily non-developer influenced sources.

Respondents who anticipated some form of recreation opportunity to be available at the lake site were asked to list up to five specific activities in Q6. A simple count of these activities resulted in the frequency ranking illustrated in Table 5.8. The percentages on this table denote the proportion of respondents who mentioned a specific activity out of those respondents who had indicated that they had anticipated recreational opportunities at Beaumaris Lake.

The most frequently mentioned activity for the overall group of respondents was skating (75.0 percent) followed by boating (66.4 percent), bicycling (55.5 percent) and walking (53.9 percent). Jogging, cross-country skiing, picnicking, fishing and swimming followed and ranged from 64.9 percent for jogging to only 6.3 percent of the respondents mentioning swimming. Some of the "other" activities listed in such small numbers that they were not ranked, included: kite flying, commuity gatherings, roller skating and relaxing.

Only two activities were mentioned to significantly different levels between locational groups. The first activity for which there was a significant difference between locational groups was jogging. More LV residents (60.6 percent) anticipated being able to participate in jogging than did NLV residents (42.1 percent). The second significant difference was identified for the activity of picnicking. In this instance NLV respondents mentioned anticipated picnicking (31.6 percent) more frequently than LV respondents (12.1 percent). The reason for this difference may be due to the simple fact that LV residents can picnic in their backyard with the same aesthetic benefits as NLV respondents who must travel to the park site to receive these benefits. The LV residents would therefore have less of an incentive to leave their yards for a picnic in the park.

D. Actual Recreational Use of Beaumaris Lake

The third subproblem of this study was "to identify the recreation opportunities realized by households in the Beaumaris neighbourhood." This subproblem was addressed by analyzing the data gathered through responses to Q7, Q8 and Q9 of the questionnaire.

Table 5.9 represents a summary of the data collected in Q7 of the questionnaire. The activities listed in this section had been suggested in various municipal stormwater lake

TABLE 5.8

ANTICIPATED ACTIVITIES BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

ANTICIPATED ACTIVITY	Lakeview (N=33) %	Non-lakeview (N=95) %	Total (N=128) %
Skating	75.8	74.7	75.0
Boating	78.8	62.1	66.4
Bicycling	54.5	55.8	55.5
Walking	60.6	51.6	53.9
Jogging*	60.6	42.1	46.9
Cross-Country Skiing	36.4	29.5	31.3
Picnicking*	12.1	31.6	26.6
Fishing	9.1	9.5	9.4
Swimming	3.0	7.4	6.3

Notes:
* = significance, x^2 test, p 0.1

Miscellaneous activities not included in the table were Frisbee throwing, Tanning, Playground, Sports Games, etc.

TABLE 5.9

FREQUENCY OF PARTICIPATION BY RESIDENTS IN SELECTED RECREATION ACTIVITIES AT THE BEAUMARIS SITE

		ANNUAL FREQUENCY					
ACTIVITY	Participation Score	Not at all	1 to 10	10 to 20	20 to 30	>30	NR*
Walking	486	5	52	54	30	59	9
Bicycling	294	35	52	39	20	26	37
Ice Skating	224	37	87	29	9	13	34
Jogging	204	56	52	23	14	16	48
Photography	84	83	56	8	4	0	58
Sun Tanning	73	106	21	12	4	4	62
Frisbee	60	109	26	8	2	3	61
Picnicking	53	110	26	6	1	3	63
Bird Watching	52	109	28	5	2	2	63
Nature Study	46	109	35	0	1	2	62
Tobogganing	42	117	21	4	3	1	63
Cross-Country Skiing	38	121	22	8	0	0	58
Non-power Boating	31	125	12	6	1	1	64
Fishing	15	132	3	0	0	3	71
Swimming	12	135	1	0	1	2	70

. . .cont.

ACTIVITY	Participation Score	Not at all	1 to 10	10 to 20	20 to 30	>30	NR
Wading	9	136	0	1	1	1	70
Model-boat	5	138	2	0	1	0	68
Snow-shoeing	2	137	2	0	0	0	70

Notes:
Participation score calcualted on basis of:

1. Frequency of 1 to 10 categories x 1 = 1z
   Frequency of 10 to 20 categories x 2 = 2z
   Frequency of 20 to 30 categories x 3 = 3z
   Frequency of over 30 categories x 4 = 4z
2. 1z + 2z + 3z + 4z = Participation Score

* NR = No response

policies and by other recreation studies. In essence, the table shows the number of respondents and their household's indicated level of participation over the past year in each recreational activity listed on the questionnaire. One of the limitations of this question was that although a "not at all" category response was listed it appears that some respondents simply chose not to answer the question rather than indicate the "not at all" category. In Table 5.9 the "not at all" and "no response" are both listed and the reader should be aware of their close relationship.

Recreational activities were ranked according to the participation score for each activity. This score was calculated by multiplying the number of responses for each frequency by a corresponding weighting and adding the results (see Table 5.9 for a further explanation). The intent of this score was to enable the comparison of activities on the basis of their overall popularity in terms of participation. The scores do not indicate actual participation rates but rather are used for comparative purposes between activities.

On the basis of participation scores: walking, bicycling, ice skating, jogging and photography are ranked from one to five. The least participated in activities included fishing, swimming, wading, model boat sailing and snowshoeing and were ranked from fourteen to eigtheen. The middle ranking in terms of the participation scores included activities such as sun tanning, bird watching, cross-country skiing, and non-power boating.

When compared to activity rankings based on participation of residents throughout Edmonton as a whole, a similar ordering is evident. Activities such as walking for pleasure and snow-shoeing are ranked high and low respectively for both sources of rankings. However, differences between rankings show the activities of picnicking and boating to be considerably lower in rankings and the activities of ice skating, photography and jogging to be ranked considerably higher for the study area than the city as a whole (Edmonton Parks and Recreation 1981). These differences in ranking suggest that the strength and weaknesses of the Beaumaris Lake site lie in its provision of recreation opportunities related to those activities just mentioned.

Table 5.10 shows the participation scores of each activity by location. The activities are listed according to their overall activity rank. Individual activities are then ranked for each locational variable allowing for a comparison across locations.

Sun tanning, bird watching, cross-country skiing and non-power boating are all ranked at least four positions higher for LV respondents than for NLV respondents. The greater ranking for these activities may have resulted from the fact that the LV respondents receive constant visual enticement to participate whereas NLV respondents do not. The higher ranking for boating shown by LV respondents in terms of actual paricipation corresponds to their expectations for boating which were greater than NLV respondents expectations.

Differences in rankings of at least four levels which favour of NLV respondents include: frisbee throwing, picnicking, and nature study. The higher ranking shown for picnicking by NLV respondents corresponds to the difference in terms of anticipated activities. In both instances picnicking appears to be more important to NLV respondents than to the LV respondents.

The similarities between locational groups were also noteworthy. The ranking based on the participation score for each activity was identical or varied only slightly for

TABLE 5.10

ACTIVITY PARTICIPATION ON THE BASIS OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

	LAKEVIEW		NON-LAKEVIEW		TOTALS	
ACTIVITY	Rank	Participation Score	Rank	Participation Score	Rank	Participation Score
Walking	(1)	137	(1)	349	(1)	486
Bicycling	(2)	86	(2)	208	(2)	294
Ice Skating	(3)	83	(3)	141	(3)	224
Jogging	(4)	63	(4)	141	(4)	204
Photography	(6)	30	(5)	54	(5)	84
Sun Tanning	(5)	37	(9)	36	(6)	73
Frisbee	(11)	14	(6)	46	(7)	60
Picnicking	(13)	9	(7)	44	(8)	53
Bird Watching	(7)	27	(11)	25	(9)	52
Nature Study	(12)	10	(8)	36	(10)	46
Tobogganing	(10)	14	(10)	28	(11)	42
Cross-Country Skiing	(8)	18	(12)	20	(12)	38
Nonpower Boating	(9)	16	(13)	15	(13)	31
Fishing	(14)	6	(14)	9	(14)	15
Swimming	(15)	4	(16)	8	(15)	12
Wading	Nil	Nil	(15)	9	(16)	9
Model Boating	Nil	Nil	(17)	5	(17)	5
Snowshoeing	(16)	1	(18)	1	(18)	2

the top ranked activities of walking, bicycling, ice skating, jogging, and photography. The bottom ranked activities of fishing, swimming, wading, model boating and snowshoeing were also similarily ranked within each locational group. It is interesting that the locational groups are similar at the two ends of the scale, but vary in the middle.

Question 8 of the questionnaire asked respondents to write the rank corresponding to the seasons of their most to their least use of the lake site (Table 5.11). Summer received the highest portion of first place votes, spring received the highest portion of second place votes, fall the highest portion of third place votes and winter the highest portion of fourth place votes. This ordering also resulted through ranking by seasonal use scores. These scores were calculated on the basis of the sum of the absolute frequencies of each cell multiplied by the reverse of the rank value, for each season (refer to Table 5.11 for an explanation).

The ranking of seasonal use with winter being listed as the season of least use and summer being the season of most use corresponds to the data collected dealing with activity paricipation. This correspondence is evident in that the majority of activities listed such as walking, bicycling, jogging, sun tanning, and picnicking tend to occur more frequently during the warmer months. Winter activities such as tobogganning, snowshoeing, and cross-country skiing were ranked lower in terms of participation than the more typically warm weather activities. Ice skating was the one exception to this trend in that it received a high ranking. However, notwithstanding ice skating, winter related activities were generally ranked lower in terms of participation than warm weather activities. The seasonal use rankings of summer and winter therefore support and reinforce the activity participation rankings.

Seasonal use rankings vary slightly between locations in that the LV respondents indicate that winter is ranked third and fall is ranked fourth in terms of lake site use (Table 5.12). This reversal from the NLV ranking corresponds to the relatively higher rank given to cross-country skiing in terms of the LV compared to the NLV activity participation score.

Having established their actual use of the Beaumaris Lake site for recreation, respondents were asked to indicate the importance of this site in terms of their household's total recreation participation . Over 23 percent of the respondents felt that the site was very important in terms of their household's total recreation participation (Table 5.13). An additional 46.2 percent felt that the site was somewhat important. Significant

TABLE 5.11

SEASONAL RANKING BASED ON RECREATION PARTICIPATION

RANK	Summer		Spring		Fall		Winter	
	(n)	%	(n)	%	(n)	%	(n)	%
First	(149)	71.3	(24)	11.5	(7)	3.3	(20)	9.6
Second	(35)	16.7	(74)	35.4	(51)	24.4	(42)	20.1
Third	(7)	3.3	(55)	26.3	(81)	38.8	(32)	15.3
Fourth	(2)	1.0	(33)	15.8	(46)	22.0	(89)	42.6
No Response	(16)	7.7	(23)	11.0	(24)	11.5	(26)	12.4
Total	(209)	100.0	(209)	100.0	(209)	100.0	(209)	100
Overall Seasonal Use Score*		717		461		393		359

Notes:
*Score is calculated on the basis of the sum of the absolute frequencies of each cell multiplied by the indicated rank value where First=4, Second=3, Third=2, Fourth=1, and No Response=0. Higher scores indicate a relatively higher rank.

TABLE 5.12

SEASONAL USE SCORE BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

	LAKEVIEW		NON-LAKEVIEW		TOTAL	
SEASON	Rank	Seasonal Use Score	Rank	Seasonal Use Score	(Rank)	Seasonal Use Score
Summer	(1)	311	(1)	526	(1)	717
Spring	(2)	113	(2)	348	(2)	461
Fall	(4)	95	(3)	294	(3)	399
Winter	(3)	102	(4)	257	(4)	359

TABLE 5.13

IMPORTANCE OF BEAUMARIS LAKE FOR HOUSEHOLD RECREATION BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

	LOCATION					
DEGREE OF IMPORTANCE		Lakeview %		Non-lakeview %		Total %
Not at all or not too important		25.0		32.7		30.7
Somewhat important		30.8		51.3		46.2
Very important		44.2		16.0		23.1
TOTAL	(52)	100.0	(156)	100.0	(208)	100.0

Chi-square = 17.75; d.f. = 2; $p<0.0001$

differences arose between locational groups, in that LV respondents indicated that the lake site was more important to their households total recreation participation than did NLV respondents. A total of 44.2 percent of LV respondents felt that the lake site was very important while only 16.0 percent of the NLV respondents felt that the site was very important.

E. Summary and Conclusions

The analysis in this chapter has revealed some significant trends and significant differences between lakeview (LV) and non-lakeview (NLV) respondents. Socio-demographic differences between locational groups included the fact that LV respondents tended to have higher incomes, be older, to be male, and have lived in the Beaumaris neighbourhood for a shorter length of time than NLV respondents.

The overall expectations of respondents indicated that Beaumaris Lake was felt to be an important factor in the original decision to move to the area; was generally recognized for its stormwater management function; and was expected to provide on-site recreation opportunities. Ice skating and boating were the top ranked activities in terms of anticipation.

Significant differences between locational groups included the fact that LV respondents tended to place more importance on the presence of the lake as a factor in their decision to reside in the area than did NLV respondents. Lakeview residents were also more aware of the stormwater management function when they originally moved to the neighbourhood than were NLV respondents. Finally LV respondents anticipated participating in the on-site activity of jogging more frequently than NLV respondents but anticipated participating in on-site picnicking less frequently.

Actual participation in recreational activities at the Beaumaris Lake site has been most prominent in activities such as walking, bicycling, ice skating, jogging and photography. The ranking of summer as the most and winter as the least active season for on-site activity supports the activities participation ranking in that summer related activities predominate over winter related activities. The lake site was also generally recognized by the respondents as being at least somewhat important to their household's total recreation participation. This finding supports to the idea that people tend to spend the majority of their free time in their local environment.

Participation differences between LV and NLV respondents include higher rankings given by LV respondents to participation in sun tanning, bird watching, cross-country skiing, and non-power boating. Non-lakeview respondents ranked the activities of frisbee, picnicking, and nature study higher than their LV counterparts. Of particular interest was the fact that LV respondents indicated that the lakesite was significantly more important for their household's total recreation participation than did NLV respondents.

This chapter has identified that the Beaumaris neighbourhood residents did have expectations that Beaumaris Lake would serve a recreation function when they originally moved to the neighbourhood. It was found that the residents have been able to meet some of these expectations through actual participation. Chapter VII will make this comparison in more detail. Several significant differences were also found between LV and NLV respondents concerning socio-demographic characteristics, original expectations, and actual participation. Overall, LV residents tended to have higher expectations for the lake and appear to feel that the lake is more important for their actual recreation participation than did NLV residents. The following chapter advances the evaluation of the recreation function of Beaumaris Lake by investigating resident attitudes towards the lake setting.

VI. RESIDENT ATTITUDES TOWARDS THE BEAUMARIS LAKE SETTING

A. Introduction

The intent of this chapter is to examine the attitudes of Beaumaris Neighbourhood residents towards the Beaumaris Lake setting. In making this examination, subproblem four will be partially addressed in that positive and negative factors which may affect resident satisfaction will be explored.

The review of literature identified many potential issue areas related to stormwater lakes. Questions 10 through Q22 were designed to help the respondent focus on selected issue areas and to indicate their opinion on each issue. Respondents were asked to mark whether they strongly disagreed, disagreed, were neutral, agreed or strongly agreed with a series of attitudinal statements. These Likert scale response formats were collapsed in the analysis so that the strongly disagree responses were coded as disagree responses and the strongly agree responses were coded as agree responses. The data were collapsed in this manner for two reasons. Firstly, patterns and trends within the data were simplified and more pronounced when examined on the basis of three rather than five response categories. Secondly, collapsing the data to three response categories reduced statistical problems associated with empty or low cells within the contingency tables in which these data were analysed.

In addition to the Likert scale type of question, open ended responses were sought in Q23 and at the end of the questionnaire under "additional comments". These open ended questions were designed to allow the respondents to identify their opinions on issue areas which had not been covered adequately in the closed questions.

The analysis in this chapter is broken down into two major sections. The first section concerns the analysis of respondent attitudes towards the lake setting. This section is then further broken down into attitudes related to the physical, biological, social and managerial components of the setting. The second section of this chapter will analyse respondent opinions with regard to water quality.

B. Respondent Attitudes Towards the Beaumaris Lake Setting

Table 6.1 illustrates the proportion of respondents agreeing to the various attitude statements in the questionnaire concerning Beaumaris Lake. The attitude statements are grouped into the four components of the setting. Responses to the open ended questions will be used in conjunction with Table 6.1 to analyse the physical, biological, social and managerial components of the lake setting.

Physical Setting

The statements designed to solicit respondent opinions on the physical component of the setting included: Q14 on locational convenience, Q18 on benifits in terms of scenery, and Q10 on the actual physical design of the lake.

The highest level of agreement given to any of the attitudinal statements was awarded to Q14 to which 96.1 percent of the respondents agreed that the lake was conveniently located for household members to visit for recreational purposes. In this regard, one respondent stated that the close proximity of the lake enabled his household to participate in recreational activities ". .. on the spur of the moment". It is evident from this overall response that Hester's (1975) concept of barriers related to functional distance as well as actual distance was not perceived by the respondents as being a significant barrier to their recreation participation at the Beaumaris Lake site.

Lakeview residents (92.3 percent) were slightly less positive regarding the locational convenience of the lake than NLV residents (97.4 percent). As LV residents are generally closer than NLV residents in actual distance, some form of barrier must affect their perception of the functional distance. One possible explanation is that while LV residents do have a clear view of the lake from their back yard, in order to actually get to the lake site these residents must use a public access route which may be located a few houses away. Therefore there may be a slight psychological barrier for these respondents as they can not walk straight down to the lake due to the fencing.

The second highest ranked attitude statement asked respondents if the views and scenery in their community were enhanced by the lake. A total of 94.7 percent of the respondents agreed that the views were enhanced. One respondent expressed his/her agreement by stating that the ". .. lake provides a nice bit of country to our area".

TABLE 6.1

RESPONDENTS AGREEING TO BEAUMARIS LAKE ATTITUDE STATEMENTS

ATTITUDE STATEMENTS	LOCATION			
	Lakeview	Non-lakeview	Total	
	%	%	(n)+	%++
Physical Setting				
Convenient location*	92.3	97.4	(207)	96.1
Enhanced scenery	98.0	93.5	(206)	94.7
Positive physical design	80.4	73.5	(206)	75.2
Biological Setting				
Facilitation of nature appreciation	90.4	79.9	(206)	82.5
Encourage secondary recreation activities	27.5	36.8	(206)	34.5
Social Setting				
Relaxed neighbourhood atmosphere	84.3	82.4	(204)	82.8
Non-Resident user problem	34.7	21.9	(204)	25.0

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ATTITUDE STATEMENTS	Lakeview	Non-lakeview	Total	
	%	%	(n)$^{+}$	%$^{++}$
Often too crowded**	7.8	3.9	(206)	4.9
Managerial Setting				
Clean and well maintained	41.2	40.5	(204)	40.7
Safe as an unsupervised site	46.0	37.4	(205)	39.5
Stormwater function priority	21.6	19.4	(206)	19.9
Over regulated**	7.8	20.6	(206)	17.5

Notes:
* = significant at x^2 test, p 0.05
** = significant at x^2 test, p 0.10
+ = total number of respondents
++ = % of those respondents that indicated that they agreed or strongly agreed

Although representing the minority, the following opinion was expressed by another respondent: "The beauty of the lake and park has been disrupted by [the] big houses built surrounding it". This respondent went on to state that the lake site was not a pleasant place to go for a walk or to relax because all you would see were houses rather than nature. The overall positive attitude of respondents towards the aesthetic benefits of the lake was similar to the findings of Debo's (1977) and Baxter and Mulamoottil's (1981) findings although neither of these studies separated aesthetics from the more general question of "overall benefits". No significant difference was found between LV and NLV in terms of the perceived aesthetics with both groups being very positive in this regards.

The third factor of the lake setting's physical component dealt with the physical design of the lake. Respondents were asked if they felt that the physical design features of the Beaumaris Lake site encouraged its use for recreational activities. Once again a relatively high proportion of the total respondents at 75.2 percent agreed that the physical design did encourage recreation. Positive comments solicited in the open ended questions concerned specific features such as the site lighting which "in the evening encourage[s] walking, jogging [and] cycling". Other open ended responses focussed on the negative aspects of the design. These comments included: "I feel that some small playground facility for smaller children could be provided", "One reason for lack of use is - no picnic facilities", "It should have a wider band of park surrounding the lake", and "Benches should be replaced [so that they] look out at the lake and are not sheltered from [a] view of the lake".

Although a large majority of the respondents indicated that the site design was basically good in terms of facilitating recreation, many comments were made about specific improvements which could be made. In addition to the comments already listed some respondents mentioned that the pathway surrounding the lake was too narrow and that some guard rails needed to be placed where there were steep banks dropping off to the water.

Biological Setting

Attitudes towards the biological component of the lake setting were investigated in terms of the respondents' opinions of the lake setting's capability for facilitating nature appreciation and in terms of the respondents' opinion of the types of recreational acivities which should be allowed based on water quality. Question I7 stated that the lake site provides the opportunity for individuals to enjoy and appreciate nature. A total of 82.5 percent of all the respondents agreed with this statement. This percentage represented the fourth highest ranking of agreement for any attitudinal statement. Although this statement received a high positive level of response there were few corresponding statements made by respondents in the open ended question. However some respondents did suggest that more natural area and vegetation were needed.

Hestor (1975) claimed that one of the determinants of the use of neighbourhood space is the resident's ability to relate to the natural environment. In the case of Beaumaris Lake it appears that the majority of LV as well as NLV respondents feel that they are able to satisfactorily relate to this natural environment.

The second attitudinal statement relating to the biological component of the setting was Q21 which asked whether recreation activities which might involve accidental or temporary contact with the water should be discouraged due to the water quality of Beaumaris Lake. An overall total of only 34.5 percent agreed with this statement, 40.3 percent disagreed and 25.2 percent were neutral. No significant differences between LV and NLV respondents were identified in this regard.

The divergent opinions expressed in this response were parallelled in the open ended responses. Statements which suggest that the water quality problems were not serious enough to stop these types of recreation activities included: "The chemical properties of storm lakes are basically the same as any well visited lake in Alberta or any place else" and "Swimming would be as safe in as any other lake". The opposite view that the water quality may be inadequate was expressed by another respondent in his statement that: "The fact that the water is not treated, makes us hesitant in doing any water activities due to possible accidental contact". Overall it does not appear that the majority of respondents are convinced of the seriousness of the water quality problem. Given this fact it is worth noting that at the time of the survey, secondary water based activities such as boating were not being permitted by the City authorities because they felt the water quality was too poor.

Social Setting

Attitudes towards the social component of the setting were explored in terms of the type of neighbourhood feeling resulting from the lake, whether non-resident use of the site was perceived as a problem, and whether on-site crowding was considered a problem. In addition to these factors, attitudes towards the social issues of vandalism and behavioural conflicts between recreational groups were expressed in the open ended questions.

Question 17 asked respondents whether they felt that the lake site contributed towards a relaxed neighbourhood atmosphere. A total of 82.8 percent of the respondents agreed with this statement (Table 6.1). Related comments included the statement that the lake provided ". . . a generally quiet peaceful site for relaxation".

The high proportion of respondents who feel that the lake site provides a relaxed neighbourhood atmosphere corresponds to Debo's (1977) study. Debo (1977) found that urban lakes which provided substantial public access tended to be perceived of as encouraging a neighbourhood atmosphere. The fact that there was no significant difference between Beaumaris locational groups in this regards also corresponds to Debo's findings. Baxter and Mulatmoottill (1981) also found that their study lakes tended to promote a sense of community.

Perceptions on non-resident users were solicited through Q15 which asked whether the use of the lake site by people who did not reside in the immediate area had been a problem. A total of 25.0 percent of the respondents agreed that there was a non-resident user problem. Approximately an equal amount were neutral and over half of the respondents disagreed with the statement. In one of the few comments made in the open ended questions about the subject, one respondent wrote that ". .. outsiders should not be allowed to use the lake". Although this type of response represents the minority it is fairly significant that 25.0 percent of the respondents do see a problem. It is possible that this 25.0 percent have assumed that "outsiders" were the cause of past vandalism at the site. There also may be a parallel between the identification of a non-resident user problem and Hestor's (1975) concept of symbolic ownership. The respondents who feel that there is a non-resident user problem may also feel that their community at least symbolically owns the lake rather than the City of Edmonton as is actually the case. No significant differences were found between LV and NLV respondents in terms of their perception towards non-residents.

The third factor of the social component of the setting which was investigated related to perceived on-site crowding. In response to Q14 which stated that the lake site was often too crowded to enjoy visiting for recreational purposes, only 4.9 percent of the respondents agreed. The majority of comments expressed the opposite view. A typical response was that "[I] like it [the lake setting] because it is quiet and not over crowded". Although no negative comments were recorded concerning on-site crowding there were several comments regarding increased residential density in the neighbourhood. One respondent wrote that: "Further high density resident areas such as highrise apartment buildings will definately drive us away from the Beaumaris area". These unsolicited concerns about the residential density reflect similar fears expressed by lake community residents in Baxter and Mulamoottil's (1981) study.

Although neither locational group appeared to perceive a significant on-site crowding problem a greater proportion of LV residents (7.8 percent) than NLV residents (3.9 percent) did in fact feel that it was a problem. One possible explanation for this difference is that recreational users of the lake have a more direct effect on LV residents. This idea was stated by one LV resident who wrote ". .. the amount of people always walking or jogging gives the people living on the lake front less privacy". This comment is probably based on the fact that a public walkway exists between the lake shore and the houses backing on to this property. People using this walkway have a clear view of most of the private yards backing on to the lake property. Beaumaris park users therefore have a much greater impact on LV residents than on the NLV residents who are only affected by park users when they actually visit the site.

Vandalism emerged as a significant social factor of the Beaumaris Lake setting even though it was not included in the attitudinal questions of the questionnaire. Twenty comments directly mentioning vandalism were recorded from the responses to the open ended question Q23 and the space provided for general comments at the end of the questionnaire. A typical comment regarding vandalism was: "The major problem with this lake is vandalism - 'children' throwing in unistone bricks, rocks, shopping carts, and children/adults destroying trees etc. in the park area". Additional comments focussed on solutions to the problem which included the need for increased supervision and faster development. Comments like "[The] housing should have gone up much sooner to prevent destruction/unsavory environment" suggest that as the area becomes more fully developed the major acts of vandalism will decrease due to normal neighbourhood surveillance.

A second unsolicited social factor related to the Beaumaris Lake setting concerned park user conflicts. One of the most frequently mentioned user conflicts related to dogs. Complaints about dogs being in the park area outnumbered complaints about not being allowed to walk a dog in the park area by nineteen to five. On the anti-dog side one respondent wrote "Although 'No Dogs' signs are posted, people deliberately exercise their pets ignoring this rule. As a result, dog excretion is bountiful". On the pro-dog side of this conflict another respondent wrote that he ". .. would use it [the lake site] more often were it not for the restrictive Parks and Recreation regulations about dogs".

The second behavioural conflict arose between the activity of bicycling and the activities of walking or jogging. There were a total of eight comments identifying this conflict. The problem arises because the paved pathway surrounding the lake is too narrow to allow cyclists to comfortably pass walkers and joggers. In addition some activity participants were felt to lack courtesy in their interaction with other activity participants.

Managerial Setting

The fourth component studied in terms of resident attitudes towards the Beaumaris Lake setting dealt with maintenance, safety and supervision, the stormwater management function and recreation regulations. A total of 40.7 percent of the respondents agreed with Q13 which stated that the Beaumaris Lake site was usually clean and well maintained. Conversely 50.0 percent disagreed and 9.3 percent were neutral towards the statement.

Of the open ended responses concerning maintenance the vast majority involved complaints with twenty-eight separate comments about inadequate maintenance. In this regard one respondent simply stated: "We are disappointed with the way the lake has been maintained". Representing the other side of opinion was the respondent who felt that : "The grounds are well kept both winter and summer". Several respondents also complimented the City of Edmonton for clearing the snow for a skating rink in the winter. An example of this type of acknowledgement stated that the ". . . City's snow clearing on (the) skating rink makes outdoor skating an attractive activity".

Debo (1977) found that the perception of maintenance problems varied substantially between his study lakes. Overall, however, the perception of serious maitenance problems appears to be less for Beaumaris Lake than for Debo's study lakes. The relative polarization between those who perceive a maintenance problem at Beaumaris and those who did not perceive the problem was an interesting feature of the data. Also of note was the fact that no significant differences existed between LV and NLV respondents regarding their opinions on maintenance. It is surprising that LV respondents were not relatively more critical of maintenance in that they would have had greater day to day awareness of any maintenance problems and that they must consider the effects of maintenance problems on their greater housing investment.

The data revealed that 39.5 percent of the respondents agreed with Q11 which stated that the lake site was safe as an unsupervised recreation setting within the community. No significant differences were evident between locational groups regarding this issue. Of those respondents who disagreed it appeared from their written comments that two factors were responsible for their belief in the need for supervision. The first factor related to the obvious physical danger of young children accidently falling into the lake and drowning. This concern was expressed seven times in the responses to the open ended questions. However, the majority of the written comments dealt with social problems which affect user safety. Two of the eigtheen statements which expressed this concern were: ". . . there could be more supervision by the police department, especially on weekends since youths invade and throw beer bottles sometimes breaking them on the rocks" and "I don't like the young teenagers who drink and listen to loud music on weekends and at night . . I think it [Beaumaris Lake] is beginning to get misused".

It should be noted that there appears to be a close relationship between vandalism, maintenance and the need for supervision. Respondent comments regarding these issues would often discuss two or more at once. An example would be a complaint regarding broken glass on the site. This may initially be brought up as a maintenance problem but later expanded to comments about the cause (vandalism) and possible solutions such as supervision. Respondents did emphasize the seriousness of their concerns in reference to these related issues.

Only 19.9 percent of the respondents agreed with the statement Q-20 that the use of Beaumaris Lake for stormwater management deserves a higher priority than the use of the lake for recreation. While 47.1 percent of the respondents disagreed, a relatively high 33.0 percent indicated that they were neutral. No comments directly related to this question were recorded in the responses to the open ended questions. It is interesting to compare this indicated reluctance to have Beaumaris Lake function primarily for stormwater management against the relatively high proportion of respondents (68.4 percent) who had known of the stormwater function of the lake when they originally moved to the neighbourhood. It is possible that although respondents originally knew of the stormwater function of the lake they may not have realized that this was the primary function. Alternatively the respondents may feel that the priority of the lake functions should reverse so that recreation becomes the primary function and stormwater management becomes a secondary function. In either case, the low resident support for acknowledging stormwater management as the primary function of Beaumaris Lake presents difficulties for the City of Edmonton in implementing management policy. No significant differences existed between LV and NLV respondents concerning this position.

The final attitudinal statement related to the management component of the setting dealt with recreation regulations. A low 17.5 percent of all respondents agreed to the statement Q-12 that the regulations governing the recreational use of the lake site were too restrictive (Table 6.2). There were few comments in the responses to the open ended questions related to this attitude other than the expressed disappointment of a few dog owners at not being able to walk their dogs in the park surrounding the lake. It is interesting to note that at the time of this survey boating was not being permitted although it had been permitted in previous years. As a result of this restriction, a higher level of agreement was expected regarding the over-regulation statement. One possible explanation for the failure to receive a higher proportion of agreement on this statement is that the respondents were not yet aware of the boating restriction. Alternatively the respondents may have been aware and in support of the boating restrictions. In addition, respondents may feel that the recreational regulations help to reduce the social problem such as vandalism and loud partying.

Lakeview (LV) respondents tended to disagree with the statement concerning over-regulation (72.5 percent) more strongly than NLV respondents (58.7 percent). This difference is somewhat surprising in that LV respondents had ranked boating high in terms of anticipated activities but were not permitted to participate in boating at the time of the survey due to City regulations. Nevertheless, one plausible explanation is that LV respondents may have felt that the recreation regulations control any excess impact on their households such as increased noise and a further reduction in privacy.

TABLE 6.2

PERCEIVED OVER REGULATION
BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

OVERLY RESTRICTIVE RECREATION REGULATIONS	LOCATION					
	Lakeview		Non-lakeview		Total	
		%		%		%
Disagree		72.5		58.7		62.1
Neutral		19.7		20.7		20.4
Agree		7.8		20.6		17.5
TOTAL	(51)	100.0	(155)	100.0	(206)	100.0

Chi-square = 4.80; d.f. = 2; $p<0.09$

C. Respondent Water Quality Perceptions

Water quality relates to the biological component of the setting of which respondent attitudes have been already discussed to a limited extent. Resident perception of water quality has been selected as a separate section of this chapter because it has been identified as one of the most important issues in the literature dealing with man made lakes (Debo 1977), with stormwater lakes (Mulamoottil 1979; Baxter and Mulamoottil 1981, Chambers and Tottle 1978) and with Beaumaris Lake itself (The Edmonton Journal: 1980).

In Q22 residents were asked to indicate to what degree they felt six potential water quality problems were in fact an issue. Table 6.3 illustrates the proportion of respondents who agreed that each water quality characteristic had been a problem. The water quality characteristics are ranked from the highest to the lowest according to the respondent's perception of the seriousness of each problem.

Scum or algae received the highest ranking with 59.5 percent of all respondents agreeing that this problem occurs at Beaumaris Lake. The presence of murky water was ranked as a close second with 59.1 percent of all residents agreeing that this problem occured. Shore weeds ranked third at 42.1 percent, lake weeds fourth at 38.1 percent followed by unpleasant odors at 23.9 percent and chemical pollution at 21.7 percent. In

TABLE 6.3

POSITIVE IDENTIFICATION OF WATER QUALITY PROBLEMS ON THE BASIS OF LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

WATER QUALITY CHARACTERISTICS	LOCATION					
	Lakeview		Non-lakeview		Total	
	(n)	%	(n)	%	(n)	%
Scum or Algae	(29)	58.0	(90)	60.0	(119)	59.5
Murky Water	(27)	57.4	(90)	59.5	(117)	59.1
Shore Weeds	(21)	44.7	(62)	41.3	(83)	42.1
Lake Weeds	(14)	30.4	(60)	40.5	(74)	38.1
Unpleasant Odors	(11)	23.4	(36)	24.0	(47)	23.9
Chemical Pollution*	(3)	7.0	(37)	26.2	(40)	21.7

Notes:
*Significant at x^2test; $p<0.05$

addition to these water quality problems, a total of twenty-four respondents listed litter or debris in the "other" category as being a serious water quality problem at Beaumaris Lake.

Table 6.4 shows the only statistically significant difference between the LV and NLV respondent's perception of water quality problems. While only 7.0 percent of the LV residents agree that chemical pollution was a problem with Beaumaris Lake, 26.2 percent of the NLV respondents agreed. In addition to this difference it should be noted that a large portion of both groups were neutral. This neutrality may have been due to the technical nature of this water quality characteristic which caused many respondents to admit that they simply did not know if there was a problem.

The top rankings given to "scum or algae" and to "murky water" corresponds closely to Baxter and Mulamoottil's (1981) findings in which these features were also the highest ranked water quality problems with 65.0 percent of the respondents identifying murky water as a problem and 64.0 percent identifying scum or algae as a problem. In contrast, shore weeds and lake weeds were perceived as a problem by only 25.0 and 24.0 percent respectively in Baxter and Mulamoottil's (1981) study. A higher proportion of Beaumaris Lake respondents agreed that shore weeds were a problem (42.1 percent) and that lake weeds were also a problem (38.1 percent). Overall, similar proportions of residents identified water quality as a problem in the Beaumaris study, the Baxter and Mulamoottil study, and the Debo study.

D. Summary and Conclusions

In terms of the attitudes related to physical factors it was found that a high majority of respondents agreed that Beaumaris Lake was conveniently located for their household's use of the site for recreation. The NLV residents agreed to this statement to a significantly higher degree than did LV respondents. Overall, the respondents also expressed a high degree of agreement with the idea that the site provided scenic benefits and that the physical design of the lake encouraged recreational use.

Under the biological component the majority of respondents expressed agreement towards the statement that the lake setting provided the opportunity for nature appreciation. However, respondents were fairly evenly divided between those who agreed and those who disagreed that secondary types of water based recreation should be restricted due to the water quality of Beaumaris Lake.

In terms of the social component, a high proportion of respondents felt that the lake setting provided a relaxed neighbourhood atmosphere. Respondents generally did not indicate that there was a problem caused by non-resident users of the lake setting. They also indicated that on-site crowding was not a problem. However, a significant difference did appear between locational groups in that although still relatively minor, LV respondents saw on-site crowding as more of a problem than did NLV respondents. Additional social problems were idenitifed concerning vandalism and behavioural conflicts between respondents who were critical of dog owners who walked their dogs by the lake. A second behavioural conflict was identified between bicyclists and walkers/joggers.

TABLE 6.4

CHEMICAL POLLUTION PERCEPTIONS BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

CHEMICAL POLLUTION PERCEPTION	LOCATION					
	Lakeview		Non-lakeview		Total	
		%		%		%
Disagree		44.2		28.4		32.1
Neutral		48.8		45.4		46.2
Agree		7.0		26.2		21.7
TOTAL	(43)	100.0	(141)	100.0	(184)	100.0

Chi-square = 8.28; d.f. = 2; $p<0.0159$

Respondents were polarized in terms of their opinion on maintenance. Approximately half felt that there were no maintenance problems while the other half felt that there were problems. A similar pattern emerged concerning the respondents' opinion as to whether the site was safe for unsupervised recreation. Only a small minority of respondents felt that stormwater management should be the primary function of the lake and only a small minority felt that the regulations governing recreational useage of the site were too restrictive. Of this minority, LV residents were significantly less likely than NLV residents to agree that the regulations were too restrictive.

Water quality perceptions were broken down into six different potential water quality problems. The respondents ranked the existence of each water quality problem in the following order: 1) scum or algae; 2) murky water; 3) shore weeds; 4) lake weeds; 5) unpleasant odors; and 6) chemical pollution. The highest ranked problems were recognized by approximately 60 percent of the respondents while the lowest ranked problems were recognized by 20 percent of the respondents. The only significant locational difference existed in that NLV respondents felt that chemical pollution was more serious than did LV respondents. In addition to these water quality problems the presence of litter and debris was identified in the "other" category as a serious water quality problem.

The majority of respondent attitudes indicate that Beaumaris Lake setting promotes resident satisfaction regarding its recreation function. However, potential barriers to recreation satisfaction have also been identified by significant proportions of the respondents. These potential barriers include: perceived maintenance problems, safety concerns, non-resident user problems, and the existence of water quality problems characterized by scum and algae and murky water. In addition, the majority of respondents indicated that they disagreed with stormwater management necessarily being the primary function of the lake.

A surprising lack of significant attitude differences exist between lakeview and non-lakeview respondents. Differences that did exist concerning convenience of location, crowding regulations, and chemical pollution, while being statistically significant do not appear to be overly important in terms of actual proportional differences.

The following chapter will examine respondent satisfaction directly. In making this examination the strength of the potential barriers to satisfaction identified in this chapter will be evaluated.

VII. RESIDENT SATISFACTION WITH BEAUMARIS LAKE

A. Introduction

In Chapter V the respondents' original expectations for the provision of recreation opportunities as well as their actual use of the Beaumaris Lake site for recreation were identified. This chapter will compare these two sets of findings. In addition to this comparison of expectations to perceived reality, a direct measure of respondent recreation satisfaction will indicate the respondents' evaluation of the recreation function of the Beaumaris Lake setting.

Respondent satisfaction will be further analysed through an investigation of its relationship to the perceived external conditions of the setting. The perceived external factors to be examined consist of the resident attitudes towards specific components of the recreation setting as identified in Chapter VI. The intent of this analysis is to identify how these factors are related to respondent satisfaction with the recreation opportunities provided by Beaumaris Lake. In essence, the analysis contained in this chapter addresses subproblem four of the study which was: "To compare the anticipated against the realized recreation opportunties of Beaumaris Lake in order to gain an indication of the level of resident satisfaction and to explore the reasons for that level of satisfaction."

B. Anticipated Recreation Opportunities Versus Actual Use of the Lake Site

Bultena and Klessig (1969) have stated that satisfaction ". . . is a function of the degree of congruence between aspirations and the perceived reality of the experience". Satisfaction with the recreation opportunities provided at Beaumaris Lake would therefore be indicated by a comparison of the original expectations of Beaumaris residents to their perceptions of the actual presence of these opportunities. If the residents expectations are met or bettered then they will likely be satisfied with the recreational aspect of the setting. If on the other hand the residents' expectations have not been met, they will likely be dissatisfied with the recreation opportunities provided by the setting.

A summary of the respondent expectations examined in Chapter V shows that 74.9 percent of the respondents felt that the presence of the lake was somewhat to very important in their decision to move to the area. A slightly lower proportion at 69.0

percent of the respondents indicated that they definately expected recreation opportunities to be available to them at the lake site. The most frequently mentioned activities were: 1) ice skating; 2) boating; 3) bicycling; 4) walking; and 5) jogging. Given these indications, it is evident that Beaumaris Neighbourhood residents had some strong expectations for recreation opportunities and had specific activity preferences in mind when they moved to the area.

In terms of actual recreation participation, 69.3 percent of all the respondents felt that the lake site was somewhat to very important for their household's total recreation participation. The top five activities participated in at the site included: 1) walking; 2) bicycling; 3) ice-skating; 4) jogging; and 5) photography.

A comparison of these expectations and actual participation shows that a similar proportion of respondents who anticipated recreation opportunities indicate that the site has in fact proven to be important for their household's total recreation participation. Of the top five most frequently anticipated activities four were ranked in the top five activities in terms of actual participation, although in a differing order. The missing activity was boating, which had been ranked a strong second as an anticipated activity but was ranked a poor thirteen according to actual participation. Along with the similarities between the top ranked activities, similarities at the lower level were also evident in that primary water based activities such as swimming were ranked low in terms of both expectations and participation. Depending on the importance placed on the boating expectations, the "congruency" between expectations and reality suggest that the majority of respondents would be satisfied with the recreation opportunities.

Locational comparisons show that while lakeview and non-lakeview respondents had similar expectations for recreation opportunities, lakeview respondents felt that the lake was a more important factor in their decision to move to the area. Lakeview residents also placed a higher degree of importance on their actual use of the lake site in terms of their household's total recreation participation than did non-lakeview respondents. Given these findings lakeview respondents would appear more likely to be satisfied with the recreation opportunities provided by the lake setting, than non-lakeview respondents.

These estimations of respondent satisfaction are of limited value. One of the reasons for this limitation is the fact that different question formats were used for collecting data on original expectations and on actual use. The difference was that while respondents were asked to list anticipated activities through an open-ended question, actual participation frequency was collected through a check list type of format. The nature of the data therefore differed between expectations and actual reality making comparisons difficult to make. A second limitation of judging satisfaction through this method is that satisfaction is determined by the quality of recreation participation, not just the quantity of participation. This element of quality has been omitted in the simple comparison of anticipated participation to actual participation. A third limitation in company expectations to participation is that respondents may not be reporting their originial expectations correctly. The respondents may in fact have conveniently forgotten unrealized expectations as a method of rationalizing their housing investment. At best, predictions on satisfaction made through these comparisons involve an element of supposition. The value of this "educated guesswork" is that it can be used as a comparative check on the more direct measures of satisfaction which will now be examined.

C. The Direct Measurement of Satisfaction

Two questions were asked in the resident questionnaire which dealt with satisfaction. Question twenty-four (Q24) was the most direct and asked that residents indicate their degree of agreement with the statement: "I am generally satisfied with the recreational opportunities provided by the Beaumaris Lake site". This question was intended to be directed at level three of Driver and Brown's (1978:26) recreation opportunity demand hierarchy which focuses on ". . . demands for opportunities to realize specific psychological outcomes that are desired from an activity opportunity and its associated preferred environmental setting". In this instance the psychological outcome being measured is resident satisfaction.

The second question related to satisfaction was Q-25, which sought the resident's opinion on the statement: "I feel that Beaumaris Lake makes a positive contribution to the overall quality of the urban environment". This question is equivalent to Driver and

Brown's (1978:27) fourth level of the recreation opportunity demand hierarchy which focuses on the: ". . . benefits that flow from satisfying experiences" such as improvements to the quality of the urban environment. Both of these questions were intended to help evaluate the recreation function of Beaumaris Lake from the perspective of the residents.

Over two-thirds or 67.3 percent of all respondents indicated that they were satisfied with the recreational opportunities provided by the Beaumaris Lake site (Table 7.1). A further 15.9 percent were neutral and 16.8 percent were not satisfied with the recreation opportunities. These proportions compare favourably with the prediction that respondents would tend to be satisfied due to the apparent congruency between their expectations and their actual use of the site.

Table 7.1 has been illustrated to emphasize the frequency of responses in terms of those who are satisfied, those who are neutral, and those who are not satisfied. It should be noted that the differences between the LV and the NLV respondents are not significant.

The admittedly crude measure of satisfaction used in the study may have over estimated respondent satisfaction. It is possible that respondents may have indicated their satisfaction as a way of rationalizing their high investment in housing. In this instance the process of dissonance reduction would operate to minimize the discrepancy between expectations and outcome (Schinkel 1980; Heberlein and Shelby 1977).

An even larger proportion of the respondents at 90.3 percent feel that Beaumaris Lake makes a positive contribution to the overall quality of the urban environment. No important or significant differences emerged between the lakeview and non-lakeview residents regarding the response to this question.

The reason for the higher proportion of positive responses to the urban environment statement likely results from the broader perception given to the quality of the urban environment than to the recreational opportunities of the site. In addition to the actual use of the site for recreation activities, respondents may appreciate: aesthetic benefits which they have separated from the recreational function; social benefits attributed to the neighbourhood as a whole rather than themselves in particular; and the vicarious benefits resulting from just knowing that the site is there although they might not

TABLE 7.1

RECREATION OPPORTUNITY SATISFACTION BY LAKEVIEW AND NON-LAKEVIEW RESPONDENTS

RECREATION OPPORTUNITY SATISFACTION	LOCATION					
		Lakeview		Non-lakeview		Total
		%		%		%
Disagree		9.8		19.2		16.8
Neutral		21.6		13.9		15.9
Agree		68.6		66.9		67.3
Total	(51)	100.0	(151)	100.0	(202)	100.0

Chi-square = 3.43; d.f. = 2; p<0.18

actually visit it often. In addition, the presence of the lake may simply provide an element of uniqueness in the urban fabric which the respondents appreciate.

D. Relationships Between External Factors and Resident Satisfaction

The purpose of this section is to identify how the respondents' perceived external conditions are associated to their satisfaction with the recreation setting. The analysis for this section is based on the crosstabulation of the attitudinal data by respondent satisfaction. The data for all of these questions has been collapsed from the five response choices of strongly disagree, disagree, neutral, agree and strongly agree to disagree, neutral, and agree. Even given the collapsed data, validity problems due to the presence of low cells in several of the crosstabulation tables still existed. The weakness of analysis based on these tables is recognized and will be reported to enable the reader to weigh the conclusions drawn from this data.

Table 7.2 shows the attitudinal responses of all those respondents who indicated that they were satisfied with the recreation opportunities provided by the lake site. These responses will be discussed according to the four components of the recreational setting.

TABLE 7.2

RESPONSES TO EXTERNAL SETTING CONDITIONS BY RESPONDENTS WHO HAD INDICATED SATISFACTION WITH THE RECREATION FUNCTION OF THE LAKE

PERCEIVED EXTERNAL SETTING CONDITIONS	Disagree %	Neutral %	Agree %	Total (n)	Total %
Physical Setting					
Convenience of Location (lc)	0.0	50.0	68.2	(136)	67.3
Enhanced scenery *(lc)	25.0	33.3	69.1	(135)	67.2
Positive physical design *(lc)	33.3	52.5	73.2	(136)	67.3
Biological Setting					
Facilitation of nature appreciation*(lc)	18.2	29.2	75.9	(135)	67.2
Discourage secondary recreation activity	69.1	70.6	62.3	(135)	67.2
Murky water *	70.6	89.1	57.4	(131)	67.2

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PERCEIVED EXTERNAL SETTING CONDITIONS	Disagree %	Neutral %	Agree %	TOTAL (n)	TOTAL %
Social Setting					
Relaxed neighbourhood atmosphere*(lc)	33.3	38.1	73.1	(134)	67.0
Non-resident user problem *	67.6	75.0	60.8	(135)	67.5
Often too crowded (lc)	67.8	65.0	70.0	(136)	67.7
Safe as an unsupervised site (**)	56.3	71.4	76.9	(134)	67.0
Managerial Setting					
Clean and well maintained (lc)	59.6	73.7	75.3	(134)	67.3
Stormwater function priority *	68.4	70.1	60.0	(136)	67.3
Over regulated *	73.0	66.7	45.5	(135)	67.2

Notes:
* = significant at x^2 test, p 0.05
** = significant at x^2 test, p 0.1
lc = low cell count

Conditions of the physical setting which appear to have an important and statistically significant association with satisfaction include perceptions of the scenery and of the physical design of the setting. Respondents who perceived that the setting enhanced the neighbourhood's aesthetics and those who felt that the lake site provided a positive physical design were more likely to be satisfied with the site than were respondents who held the opposite views. However both of these observations were limited by low cell counts within their respective crosstabulation tables.

The biological setting was characterized by two factors which had statistically significant relationships with respondent satisfaction. Firstly, respondents who agreed that the lake site facilitated nature appreciation were more likely to be satisfied with the recreation opportunities of the site than were respondents who disagreed. Four out of nine cells were reported as being low on this contingency table. Secondly, respondents who agreed that murky water was a frequent problem at Beaumaris were less likely to be satisfied than were respondents who disagreed that murky water was a problem. Since a major proportion of the respondents did identify murky water as a frequent problem these respondents may represent an important portion of the 32.6 percent who did not express satisfaction with the recreation opportunities associated with the lake site.

Three factors of the social setting had important and statistically significant effects on respondent satisfaction. Respondents who agreed that the lake site provided a relaxed neighbourhood atmosphere were more likely to express satisfaction with the recreation opportunities provided by the lake than were respondents who disagreed that the site provided a relaxed neighbourhood atmosphere. The validity of this difference was limited by the fact that four out of nine cells on the crosstabulation table were low. Respondents who felt that there was a non-resident user problem tended to be less satisfied than those who did not see this as a problem. Finally, respondents who felt that the lake site was safe as an unsupervised recreation setting also tended to be more satisfied than did respondents who did not feel that the lake was a safe setting. The fact that significant although minor proportions of respondents did in fact feel that non-residents were a problem and that the lake setting was not necessarily safe may explain why more respondents were not satisfied with the setting.

The final factors examined fall within the management component of the setting. Although not statistically significant, a trend was suggested in that those respondents who felt that the lake site was usually clean and well maintained were more likely to be satisfied with the recreation opportunities provided than those that held the opposite views. This relationship was weakened in that two out of nine cells were reported as being low in the crosstabulations table. Respondents who felt that the regulations governing the recreational use of the lake site were too restrictive were less likely to be satisfied with the recreation setting than were respondents with the opposite view. Both of these differences offer partial explanations for the satisfaction or lack thereof of respondents towards the recreation opportunities of Beaumaris Lake.

Of all the factors mentioned, the ones which most probably were responsible for more respondents not being satisfied with the lakes recreation function were: the presence of murky water as an indicator of poor water quality; safety concerns including social as well as physical features; the perception of a non-resident user problem which may reflect vandalism problems, and the concern about maintenance and operation short comings. These factors have been separated for special recognition because of all of the factors investigated they showed the most significant divergence of opinion. The other factors were all weigthed overwhelmingly towards positive associations with satisfaction regarding the recreation opportunities provided by the Beaumaris Lake site. These latter factors were in fact the dominant ones in that the majority of the respondents did express satisfaction with the recreation opportunities provided by the lake setting.

E. Summary and Conclusions

A comparison of the respondents' expectations to their actual use of the Beaumaris Lake setting revealed that similar proportions expected the lake to serve a recreation function as felt that the lake site had proved to be important for their household's recreation. Of the top five anticipated activities boating was the only one which did not remain ranked within the top five activities for actual participation. Given this relative balance between aspirations and perceived reality, the respondents would seem likely to be satisfied with the recreation function of the lake.

In terms of a direct measure it was shown that 67.3 percent of the respondents were indeed satisfied with the recreation opportunities provided by the lake. No statistically significant difference between locational groups was found although a trend was suggested in that a greater proportion of NLV respondents indicated their dissatisfaction than did LV respondents.

In response to a more general satisfaction question, 90.3 percent of the respondents agreed that Beaumaris Lake made a positive contribution to the overall quality of the urban environment. The increase in positive response was felt to be due to the inclusion of aesthetics, social benefits and other intangible benefits which respondents may have excluded from their consideration of the recreation opportunity provided by the lake.

The latter sections of this chapter attempted to identify factors which were responsible for the expressed respondent satisfaction with the recreation opportunities provided by the lake site. Perceptions of murky water, safety problems, non-resident user problems and maintenance short comings were all identified as being probable reasons for an even higher degree of satisfaction not being achieved. Alternatively, factors such as the positive perception of the aesthetics, physical design, the neighbourhood atmosphere, the facilitation of nature appreciation; all appear to be major reasons for the high level of satisfaction actually expressed by the respondents.

This chapter has attempted to identify factors which may be responsible for limiting respondent satisfaction. However, this focus should not obscure the fact that the majority of respondents at 67.3 percent have expressed general satisfaction with the recreation opportunities provided by the setting and that an even higher proportion (90.3 percent) feel that Beaumaris Lake makes a positive contribution to the overall quality of the urban environment. Given these indications it is obvious that the recreation function of Beaumaris Lake is being achieved to a significant degree.

VIII. SUMMARY, IMPLICATIONS AND CONCLUSIONS

A. Introduction

This chapter will begin by reviewing the study findings and methodology. Secondly, the practical implications and recommendations based on the study findings will be discussed regarding Beaumaris Lake and stormwater lakes in general. In concluding, the final section will examine the theoretical implications and recommendations resulting from this study.

B. Review of the Study

The underlying objective of the study was to identify the success or failure of Beaumaris Lake in the fulfillment of its recreation function. A secondary objective was to evaluate the perceived effect of Beaumaris Lake on the quality of the urban environment. These objectives were met through analysis based on specified subproblems.

Summary of the Findings

Subproblem one was "to identify the city government's and the developer's intent for an incorporation of recreation opportunities into the design of Beaumaris Lake". Study findings showed that both of these parties did intend and attempt to incorporate recreation as a secondary function of Beaumaris Lake.

Design features incorporated into the physical setting included landscaped parkland surrounding the lake, bicycle/pedestrian trails, viewpoints, ornamental lighting, wooden decks and a boat ramp. In terms of the biological component of the setting the developer and City intended the water quality to be sufficient to permit most types of secondary and tertiary water related recreation activities including boating. Attempts to ensure this level of water quality included minimum lake depth specifications and total water volume turnover requirements incorporated into the lake design. The provision of public access to the shoreline and the promotion of the community identity through the lake feature demonstrate the developer and the City's intentions concerning the social component of the setting. Finally the identification of the responsibility of Edmonton Parks and Recreation regarding the operation and maintenance of the lake setting as a park site and the City's effort to inform the public about the uses and limitations of Beaumaris Lake reflect the intentions of the developer and the City regarding the managerial setting of the lake. In summary, Genstar Development and the City of Edmonton did originally intend and subsequently attempted to incorporate recreation opportunities into the Beaumaris Lake setting.

The study also successfully addressed subproblem two which was "to identify the initially anticipated recreation opportunities of households in the Beaumaris neighbourhood". In this regard it was found that residents did originally move to the study area with expectations for recreation opportunities to be provided at the lake site.

A majority of the residents identified the existence of Beaumaris Lake as being an important factor in their move to the neighbourhood. A similar majority also indicated their awareness of the stormwater management function of the lake. In both of these instances lakeview residents tended to be more positive than non-lakeview respondents. However similar proportions of the two locational groups at approximately two-thirds, indicated that they expected recreation opportunities to be provided at the lake site. Of the actual activities expected, the top five included: 1) ice skating, 2) boating, 3) bicycling, 4) walking and 5) jogging. Lakeview residents tended to mention boating and jogging more often and picnicking less often than did non-lakeview residents. Overall, the residents not only expected recreation opportunities to be available to them but they also anticipated specific types of opportunities.

Subproblem three, "to identify the recreation opportunities realized by households in the Beaumaris neighbourhood" was addressed in Chapter Five. Residents indicated that they had been active in many types of recreation activities at the Beaumaris Lake site. The highest ranked activities in terms of actual participation were listed in the following order: 1) walking, 2) bicycling, 3) ice skating, 4) jogging, and 5) photography. Locational differences regarding actual participation were highligthed by the fact that lakeview respondents ranked cross-country skiing and boating higher and picnicking lower than did non-lakeview residents. In addition to participation, the majority of residents felt that the lake site was at least somewhat important to their family's total recreation participation. A locational difference was evident in this respect also, in that lakeview respondents tended to place more importance on the lake site for recreation than did non-lakeview residents.

The fourth subproblem of the study was "to compare the anticipated against the realized recreation opportunities of Beaumaris Lake in order to gain an indication of the level of resident satisfaction and to explore the reasons for that level of satisfaction". This subproblem was addressed in Chapter Six which examined resident attitudes towards the lake setting and in Chapter Seven which examined resident satisfaction and the factors which relate most directly to it.

When asked directly, over two thirds of the respondents indicated that they were in fact generally satisfied with the recreational opportunities provided by the lake site. This proportion is compatible to estimates based on the general similarities between resident expectations and actual participation. An even higher proportion of respondents indicated that they felt that the lake was a positive feature in the urban environmment. This increase in indicated satisfaction suggests that residents perceived additional benefits resulting from the lake over and above those related to active recreation. No significant differences were found between lakeview and non-lakeview residents regarding these indicators of satisfaction.

Notwithstanding the fact that the majority of residents appear to be satisfied with the recreation opportunities provided by the lake, certain factors were seen as contributing to that proportion who were not satisfied. In this regards, the following factors were found to be associated with resident dissatisfaction.

Visual water quality problems as indicated by the high recognition of murky water characteristics by respondents were shown to be significantly related to dissatisfaction. Secondly, respondents who felt that the lake was not safe as an unsupervised recreation setting tended to be more dissatisfied. Thirdly, respondents who perceived a problem with non-resident users were more likely to be dissatisfied. Finally respondents who indicated that there was a maintenance problem at the lake site were also likely to be dissatisfied although this last relationship only approached singificance. These factors have been listed not only for the significance of their relationship to satisfaction but also because meaningful proportions of the study respondents showed attitudes corresponding to these factors.

Although the above factors illustrate some of the negative influences on resident satisfaction their combined effect was less than that of the positive influences which contributed to satisfaction. Positive influences identified in this study include the resident's favourable attitudes towards the aesthetics, physical design, convenience, nature appreciation opportunities, neighbourhood atmosphere, and current level of regulation related to Beaumaris Lake. These factors were not only positively related towards satisfaction but were also supported by the vast majority of residents.

Of special note was the finding that only a minority of respondents indicated that they felt that the primary purpose of Beaumaris Lake should be stormwater management. This finding was especially noteworthy in contrast to the fact that the majority of respondents knew of the stormwater lake function when they moved to the neighbourhood.

Study Methodology

The case study research design used was able to meet the objectives of the study and enabled the problem statement to be successfully addressed given the resource limitations of the study. However, the simultaneous study of two or more lake settings would have enabled the comparison of specific features of the settings thereby enabling more detailed conclusions to be drawn. Future studies would be advised to examine at least two study areas which would permit more detailed conclusions to be drawn.

The data collection methods and procedures chosen for the study proved successful. The major technique used was the resident self-administered questionnaire which provided the quantitative data used in the analysis. Many of the weaknesses associated with the use of self-administered questionnaires (Babbie 1973; Bailey 1978; Kidder 1981; Moser and Kalton 1971; and Oppenheimer 1966) were successfully minimized in this study.

Although often mentioned as the primary weakness of self-administered questonnaires, low response rates did not prove to be a serious problem with this study. A respectable response rate of 63.5 percent was received for the study. Although not as high as would have been preferred, the response rate was certainly higher than those often associated with self-administered questionnaires. The relatively high response rate is attributed to three main factors: 1) the sincere interest in the problem by the survey population; 2) the fact that the drop off and pickup procedures were personally conducted, and 3) the use of Dillman's (1978) advice on questionnaire and covering letter formats. Although the actual response rate was felt to be adequate the total number of responses was low for the purpose of statistical analysis at times. Difficulties arose concerning low cell counts in some contingency tables. If a larger number of questonnaires had been distributed and collected this statistical problem could have been avoided.

A second major weakness commonly listed for self-completed questionnaires was that the study respondents are frequently unrepresentative of the population. Partially as a result of the adequate response rate, the respondents in the present study were found to be generally representative of the population being studied. The exceptions were that homeowners and respondents living in single-detached dwellings were over represented.

Finally, the fact that many respondents did comment in the spaces provided for open ended responses partially addressed the criticism that self-completed questionnaires tend to be superficial. These open ended responses effectively permitted respondents to expand and add to issues identified in the closed questions.

Having addressed these weaknesses of self-completed questionnaires, the advantages of this data collection technique were also received. These advantages included time and money savings, the provision of a feeling of anonymity by the respondent, the avoidance of interviewer bias and the removal of pressure from the respondent for an immediate response.

Burton and Cherry (1970) have suggested that it is important to realize that all survey methods have weaknesses which may bias the study results. In following their advice the major weaknesses of the self-administered technique used in this study were: 1) that respondents may have misunderstood the intent of a few of the questions due to the limited written explanations provided in the questionnaire; and 2) that notwithstanding the response to the open ended questions, the data collected using this technique are not as indepth as could have been collected through a personal communication technique.

A generally favourable response was received to the actual questionnaire. However, certain modifications should be made in its future use. One significant change would be the deletion of Q32 asking for total household income. The response to this question was low and many residents who refused to return the questionnaire stated that this type of question was an invasion of their privacy. In future studies a surrogate measure for income, such as real estate prices would be advisable and worth the cost of losing the direct measure of income.

Although as an overall assessment the questionnaire was felt to be a valid instrument of inquiry, two specific items were identified as being weak in terms of validity and requiring modification in future use. The first of these was Q22 which asked respondent to identify their perceptions of the frequency of certain water quality problems. The wording of this question was awkward and may have caused some respondents to misunderstand its meaning. Question 23 also presented validity problems in that it actually asked two questions; one asking respondents to list positive factors in their use of the site and the other asking respondents to list negative factors which reduced their use of the site. This question not only presented analytic problems caused by being forced to subjectively judge whether a comment was positive or negative but it may also have resulted in confusion on the part of the respondent as to what was being asked.

A final alteration to the questionnaire would involve modifications to the questions requiring the respondent to indicate zero as a frequency (Q7 and Q29). Modifications would be made so that a blank space would indicate zero thereby eliminating the problem of distinguishing between a non-response and a zero.

Judgements on the reliability of the questionnaire can not be made because the instrument had not been previously tested in a pilot study. A positive statement as to the reliability of the instrument may only be made if replicative studies and testing are performed and are found to support this thesis. In the present study the reliability of the questionnaire has been assumed - not proven.

Although the data analysis technique used in this thesis was felt to be adequate, certain modifications should be considered in future studies of a similar nature. The first suggested modification relates to the relatively high level of chi-square probability at 0.1 which was identified as defining statisfically significant relationships thoughout this study. The decision to use a probability level of 0.1 was based on the realization that potentially important differences would not be identified at more stringent levels of probability due to the relatively low number of questionnaires (209) being analysed. If characterized by a larger data base, future studies are advised to re-examine this study's findings under more rigorous requirements for significance.

Future studies should also consider focusing on alternatives to the locational variable investigated in this study. The examination of the differences between lakeview and non-lakeview residents in this study was used primarily because it allowed for comparisons to previous perception studies related to stormwater lakes. Although some interesting differences were found between the locational groups, alternatives to an analysis based on locational differences exist.

The two variables which merit serious consideration as alternatives to location as a study focus are household income and length of residence. Since it was found that lakeview respondents tended to have a higher income than non-lakeview respondents, some of the locational differences identified in this study may in fact be due to this income difference. It should be noted that the choice of income as the study focus would be hampered by the reluctance of many residents to reveal this data. Length of residence therefore appears to be the most advisable alternative.

In this study it was also found that non-lakeview respondents had generally lived in the neighbourhood for a longer length of time than had the lakeview respondents. The locational differences identified in the study may therefore have been affected by this fact. Future stormwater lake perception studies should seriously consider examining resident satisfaction, attitudes, participation, and expectations on the basis of the length of time the respondent has lived in the area as opposed to whether the respondent lives nearer to or farther from the lake.

C. Practical Recommendations

Several recommendations may be drawn from the study. The first set of recommendations listed relate directly to the Beaumaris Lake setting. The intent of these recommendations is to suggest specific action that can be taken which will improve Beaumaris Lake as a recreation setting. These recommendations are based on the study findings and comments provided by the residents of the Beaumaris neighbourhood, Genstar, and the City of Edmonton. The implications of these recommendations are also addressed as it is realized that changing the characteristics of one of the components of the recreation setting will have effects on the other components of the setting. The second set of recommendations are aimed at the broader issue of stormwater lakes and their future development in Alberta and Western Canada. This set of recommendations is based on the lessons that the Beaumaris experience has provided.

The **physical component** of the Beaumaris Lake setting would appear to be a difficult component to change due to its physical permanence and the costs associated with alterations. Alterations to this component are needed however, and they are not necessarily expensive to implement. The first two recommendations involve the least cost and should be acted upon as soon as realistically possible. The more costly third recommendation is less urgent and may be deferred.

The first recommendation is that picnic facilities be provided on the parkland near the lake. Nothing elaborate is needed, rather simple vandal resistant picnic tables would be sufficient. The addition of these tables would meet an expressed desire of the non-lakeview residents. However, it should be noted that the presence of additional facilities may attract a greater number of non-resident lake site users and vandals. In order to reduce any problems associated with these implications, the picnic facilities should be kept to a minimum so that they do not attract undue attention. The facilities should also be continually maintained in order to discourage vandalism.

The second recommendation is that unobtrusive guard rails be placed where the perimeter pathway lies close to any steep banks leading to the water. This request was expressed in the open ended questions as a safety concern. The addition of these guardrails would reduce the safety hazard existing at these points. The disadvantage of these guardrails is that the naturalness and aesthetics of the lake site may be further reduced.

The third and final recommendation in terms of the physical component of the Beaumaris site is that the surrounding pathway be widened to avoid user conflicts between bicyclists and joggers/walkers. It is realized that the costs of such action would be expensive and that at present the conflict between bicyclists and joggers/walkers is not overbearing. However, the narrow pathway is a design shortcoming which should be addressed in the future. Widening the pathway also results in a tradeoff in that the already narrow perimeter of grass would be reduced further.

The **biological component** of the Beaumaris Lake setting has presented the most serious limitation to the recreation function of the lake. In particular this limitation results from the poor water quality of the lake. These water quality problems have been recognized and emphasized by officials from the City.

The only recommendation regarding the biological component is that the City continue its water quality monitoring program and its attempt to improve on the water quality. In this regard the City should focus its energy on the identification and correction of the improperly connected sewage systems. It is imperative that the faecal contamination of Beaumaris Lake be lowered to ensure public safety. Improvements in the visual parameters of water quality such as the reduction of the murkiness of the water and the reduction of its algae or scum characteristics should also be made. However, it should be noted that improvement of these visual characteristics will increase the local residents' perceptions of water quality. Improved water quality perceptions will be paralleled with an increased demand for the use of the lakes for recreational activities such as boating. In order to avoid dissatisfaction due to restrictive use regulations, less visible but more serious problems such as faecal pollution should be addressed prior to substantial visual improvements.

Action on the two recommendations listed concerning the **social component** of the Beaumaris setting would contribute major benefits in both the short term and the long term. The first recommendation is that some form of on-site supervision is needed in response to the respondent's requests in this respect. This supervision might initially take the form of increased police patrols, hired security or the presence of less obtrusive park staff. The presence of one of these parties would reduce vandalism and undesirable behaviour, and thereby increase resident use of and satisfaction with the setting. The negative implications of this action would not only include the expense involved but also the reduction of a recreationist's sense of freedom due to on-site supervision. A more ideal solution will hopefully occur when the lakeview properties become more fully developed and are able to take on an informal supervisory role.

The second recommendation related to the social setting is that a greater role should be played by the Community League in Beaumaris neighbourhood. The Community League could act as a ready made alternative to the "lake associations" recommended by

Debo (1977) and Baxter and Mulamoottil (1981). The Communitiy League should act as the liaison between the residents in the neighbourhood, the developer and the City. The League could also play a major role in educating the residents of the neighbourhood in terms of water quality problems, safety hazards, permissable uses and any other issues that would increase resident awareness and appreciation of the lake setting. Although the City may have to contribute some initial 'seed money' to help the Community League develop in this area, the long term benefits would likely more than cover the short term costs.

Finally two recommendations are listed regarding the **management component** of the Beaumaris Lake setting. The first recommendation is that the City should increase their maintenance program at the site. This change would not only increase resident satisfaction with the setting but would also tend to reduce the vandalism problem as well kept sites are less attractive to vandals than run down sites. There are obvious tradeoffs involving added expenditures for the City which would have to be evaluated.

The second recommendation regarding the managerial component of the Beaumaris Lake setting is that the City of Edmonton continue in its role of educating the public as to the functions and uses of the lake setting. In addition to contact with media and local schools, public workshops should be arranged through the Community League in order to keep the residents informed on current topics such as water quality. If community residents are informed of the reasons for current restrictions and of the prospect of future changes in management regulations, they are more likely to accept and follow the regulations.

It is realized that the implementation of these recommendations is going to represent increased financial and administrative cost to the City of Edmonton during a time of economic restraint. However, the City has a responsibility to accept these costs, within reason, on the basis that Beaumaris Lake was an experiment in stormwater drainage and urban living environments. The City realized at the time of design approval that problems would occur and now in fairness to the residents of Beaumaris Lake and to future stormwater lake neighbourhoods, they should act to reduce the factors identified as detracting from resident satisfaction.

The Beaumaris Lake experience has also identified a major concern which must be addressed in the development of future stormwater lakes within Alberta and Western Canada. This central concern is water quality. The long term success or failure of the recreation function of stormwater lakes depends on finding solutions to this seemingly inherent problem.

In this respect, research must continue which focuses on how to control water quality through site design features and maintenance procedures. On the basis of this research, decisions must be made which more clearly identify the level of water quality which can reasonably be expected given site characteristics and financial constraints. Additional research is also needed to identify with more accuracy the level of water quality at which certain water based recreation activities become unsafe due to health hazards. If it is found that activities such as boating are simply not usually safe on stormwater lakes due to water quality problems, steps must be taken to reduce the expectations of residents moving into the area. The obvious place to do this is through developer promotions which should not be permitted to suggest recreational activities such as boating will occur. A second obvious change would be the reduction in site amenities such as boat ramps and docks which serve to entice boating motivations. A third method of reducing resident expectations for boating activities would be to simply reduce the size of the lakes so that they would tend to encourage tertiary rather than primary and secondary types of water based recreation. The reduction in the residents' recreation expectations would result in a greater congruence between aspirations and the perceived reality of the experience. Stormwater lake community residents would therefore tend to be more satisfied with the recreation function of the lake.

Further, more detailed recommendations concerning design features of stormwater lakes have not been included in these recommendations. These features must vary according to the physical characteristics of the site prior to development along with the developer and City's objectives for the use of the site. One of the greatest contributions that stormwater lakes can make to the urban environment is in their diversity (Tottle 1979). It would be a grave mistake to standardize the design of stormwater lakes to the extent that they no longer provided this benefit.

D. Theoretical Implications and Recommendations

The "recreation opportunity demand hierarchy" presented by Driver and Brown (1978) showed the relationship between recreation activity demand, recreation opportunity demand, the demand for certain psychological outcomes, and the demands for benefits resulting from psychological outcomes. The hierarchal nature of these demands was suggested because users tend to be more aware of their demand for the first type of opportunity than they are for the second, more aware of the second type of opportunitiy than the third, and so on. This study used this hierarchal concept of demand to shift from an activity approach to a behavioural approach toward studying recreation.

The behavioural emphasis of the study was based on the idea that recreation is an experience that results from recreational engagements (Driver and Tocher 1979). The incorporation of behavioural theory into the study of the Beaumaris Lake recreation function was facilitated by the development of "A Behavioural Model of the Recreation Experience". The model attempted to integrate the behavioural aspects of an individual's recreation experience with the environmental setting in which that experience occurred. In this instance, Beaumaris Lake and its associated parkland represented the environmental setting while the recreation experience of the Beaumaris neighbhorhood residents represented the behavioural aspects of the model. The model was useful in illustrating the relationship between the variables examined in this study which included resident expectations, participation and psychological outcomes. One criticism of the model was that level four of the recreation opportunity demand hierarchy concerning benefits arising from psychological outcomes was not clearly illustrated. Although the quality of the environment was identified as the primary variable of the study, the model fell short of illustrating the relationship of this concept to the other parts of the recreation experience. The nature of the relationship between the Beaumaris residents' satisfaction with the lake's recreation function and their opinion of the lake's effect on their urban environment was not fully clarified by the model.

Clark and Stankey's (1979) concept of the recreation opportunity setting was successfully incorporated into the behavioural model. The identification of separate physical, biological, social, and managerial components of the recreation setting proved very useful throughout the analysis in this study by providing an organizational framework on which to examine the many different aspects of the setting. Problems did arise with certain aspects of the setting such as safety concerns, which seemed to cross boundaries between components. Nevertheless, provided that the artificiality of the components and the boundaries are recognized, the concept of the recreation opportunity setting is a useful research tool.

One of the most important aspects of Clark and Stankey's (1979) concept is the need for consistency between the recreation setting's components. In the Beaumaris study one inconsistency was identified between the physical component with its boat ramp and the biological component with its water quality considered to be too poor to allow for boating. It is this type of inconsistency which must be corrected if the users of a recreation setting are to maximize their satisfication.

The use of Clark and Stankey's (1979) concept in an urban recreation context also represents a variation from its typical use in a rural or wilderness setting. On the basis of its successful use in this study, future research involving recreation resources in urban areas should also consider the value of this concept as a practical framework for planning and evauating the recreation opportunity of a setting.

Resident satisfaction was used to evaluate the recreation function of Beaumaris Lake. Both the direct measure of resident satisfaction with recreation opportunities provided by the site and the comparison of resident expectation to actual participation indicated that Beaumaris Lake has been relatively successful in serving its recreational function. However, it is recognized that the satisfaction measures used in this study were very crude indicators. Further research is needed to ensure that a valid measure of satisfaction is obtainable. To be of use in a similar study the measure must remain simple so that it does not tend to dominate the questionnaire or study over other equally important aspects such as respondent attitudes toward the recreation setting.

Further research is also needed to investigate the existence of dissonance reduction within the expressed satisfaction of respondents. In the present study it is not possible to know if residents have truly expressed their satisfaction with the recreation opportunities provided by Beaumaris Lake. It remains possible that residents have subconsciously hidden their disappointment with the lake rather than admit that their housing investment was a mistake.

E. Conclusion

Numerous problems directly related to the recreation function of Beaumaris Lake have been identified by the local residents, Genstar Developmment and the City of Edmonton. Nevertheless, residents living near by the lake indicated that they were generally satisfied with the recreation opportunities provided at the lake site. In the fulfillment of the study objectives it can be concluded that stormwater lakes as represented by Beaumaris Lake, can be successful in fulfilling a recreation function and in contributing to the quality of the urban environment. Assuming that all parties involved have learned from the problems associated with the earlier lakes such as Beaumaris, the current trend toward the development of urban stormwater lakes should continue with the recognition that the lakes can play an important role by providing richness and variety within the urban environment.

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Appendix A

DEFINITION OF TERMS

Leisure:

Leisure is a "subjective state of mind" experienced to a certain degree while an individual is engaged in activities during free-time or non-working hours. People judge leisure experiences at their best when free-time activities are freely chosen and are intrinsically motivated.

Iso-Ahola 1980:9

Recreation:

Recreation is a form of individual leisure experience. It may be defined as the experience associated with activities undertaken for enjoyment during free time.

Based in part on Iso-Ahola 1980 and Gold 1980

Stormwater Lake:

A stormwater lake is a permanent water body utilized primarily for the collection, storage and controlled discharge of natural storm runoff. In addition, the lake may serve recreation and aesthetic purposes.

Based in part on The City of Calgary 1980

Satisfaction:

Satisfaction is ". . . the positive perceptions or feelings which an individual forms, elicits, or gains as a result of engaging in leisure activities and choices. It is the degree to which one is presently content or pleased with his/her general leisure exprience and situation".

Beard and Ragheb 1980

Appendix B

BEAUMARIS NEIGHBORHOOD RESIDENT QUESTIONNAIRE

☐☐☐☐

BEAUMARIS LAKE:

A Survey of the Recreational Use

of Urban Stormwater Lakes

This survey is intended to identify local resident views and opinions about Beaumaris Lake. Please have one of the heads of the household complete this questionnaire on behalf of the whole household. Approximately five days after the delivery of the questionnaire one of the researchers will call on you to retrieve it.

Thank you for your help.

Department of Recreation Administration

The University of Alberta

Edmonton, Alberta T6G 2H9

THE FIRST SECTION OF THIS QUESTIONNAIRE IS INTENDED TO COLLECT INFORMATION REGARDING YOUR EXPECTATIONS ABOUT BEAUMARIS LAKE WHEN YOU MOVED TO THIS LOCATION. PLEASE INDICATE YOUR ANSWERS BY CIRCLING THE APPROPRIATE NUMBER AND BY COMMENTING WHERE INDICATED.

Q-1 How long have you lived in this dwelling? (PLEASE CIRCLE ONE NUMBER.)

1 UP TO ONE YEAR
2 OVER ONE YEAR, UP TO TWO YEARS
3 OVER TWO YEARS, UP TO THREE YEARS
4 OVER THREE YEARS, UP TO FOUR YEARS
5 OVER FOUR YEARS, UP TO FIVE YEARS
6 OVER FIVE YEARS

Q-2 How important was the presence of Beaumaris Lake as a factor in your decision to move to this location? (CIRCLE ONE NUMBER.)

1 NOT AT ALL IMPORTANT
2 NOT TOO IMPORTANT
3 SOMEWHAT IMPORTANT
4 VERY IMPORTANT

Q-3 When you originally moved to this residence, were you aware that one of the functions of Beaumaris Lake was to store storm water? (CIRCLE ONE NUMBER.)

1 NO
2 YES

Q-4 Were you initially aware of any possible use of Beaumaris Lake or the land surrounding it for recreation? (CIRCLE ONE NUMBER.)

1 NO → GO TO QUESTION 7
2 YES ↓

Q-5 Please indicate your original source(s) for this information. (CIRCLE AS MANY NUMBERS AS ARE APPROPRIATE.)

1 REAL ESTATE AGENT
2 PAST EXPERIENCE WITH URBAN LAKES
3 FRIENDS WITH PAST URBAN LAKE EXPERIENCE AT OTHER SITES
4 NEWSPAPER, MAGAZINES OR TELEVISION
5 RESIDENTS FROM THIS AREA
6 NO SOURCE IN PARTICULAR
7 OTHER SOURCES (PLEASE LIST)

____
____

Q-6 Please list up to five specific types of recreation activities which you had anticipated as being available at the Beaumaris Lake site. (PLEASE WRITE IN THE SPACES PROVIDED.)

1 ____
2 ____
3 ____
4 ____
5 ____

NOW GO TO QUESTION 7

THIS SECTION OF THE QUESTIONNAIRE IS DESIGNED TO COLLECT INFORMATION ON YOUR HOUSEHOLD'S ACTUAL RECREATION PARTICIPATION AT THE BEAUMARIS LAKE SITE.

Q-7 Please estimate the combined total number of times within the past twelve (12) months that members of your household participated in any of the following recreation activities on or around Beaumaris Lake. The list includes activities which are not officially permitted but which could potentially take place on the site. (CIRCLE THE NUMBER CORRESPONDING TO THE APPROPRIATE COLUMN.)

		NOT AT ALL	1 TO 10 TIMES	10 TO 20 TIMES	20 TO 30 TIMES	MORE THAN 30 TIMES
(1)	WALKING	1	2	3	4	5
(2)	JOGGING	1	2	3	4	5
(3)	ICE SKATING	1	2	3	4	5
(4)	PHOTOGRAPHY	1	2	3	4	5
(5)	BICYCLE RIDING	1	2	3	4	5
(6)	CROSS-COUNTRY SKIING. .	1	2	3	4	5
(7)	SNOWSHOEING	1	2	3	4	5
(8)	TOBOGGANING	1	2	3	4	5
(9)	WADING	1	2	3	4	5
(10)	SWIMMING	1	2	3	4	5
(11)	PICNICKING	1	2	3	4	5
(12)	NON-POWER BOATING . . .	1	2	3	4	5
(13)	FISHING	1	2	3	4	5
(14)	NATURE STUDY	1	2	3	4	5
(15)	BIRD WATCHING	1	2	3	4	5
(16)	MODEL BOAT SAILING . .	1	2	3	4	5
(17)	FRISBEE THROWING . . .	1	2	3	4	5
(18)	SUN TANNING	1	2	3	4	5
(19)	OTHERS (please list)					
	______________________	1	2	3	4	5
	______________________	1	2	3	4	5
	______________________	1	2	3	4	5

Q-8 Please rank all of the following seasons in order of your household's frequency of use of the Beaumaris Lake site. (INDICATE THE SEASON DURING WHICH YOU USE THE LAKE MOST OFTEN BY WRITING "1" BESIDE IT, THE SEASON RECEIVING THE NEXT MOST USE BY WRITING THE RANK "2" AND SO ON.)

	RANK
SPRING	____
SUMMER	____
FALL	____
WINTER	____

Q-9 In terms of your household's total recreation participation both inside and outside of your neighborhood, how important is the Beaumaris Lake site? (PLEASE CIRCLE ONE ANSWER.)

1 NOT AT ALL IMPORTANT
2 NOT TOO IMPORTANT
3 SOMEWHAT IMPORTANT
4 VERY IMPORTANT

THIS SECTION OF THE QUESTIONNAIRE IS DESIGNED TO IDENTIFY SOME OF THE PRIMARY REASONS FOR THE USE OR NON-USE OF THE BEAUMARIS LAKE SITE FOR RECREATION. PLEASE READ EACH STATEMENT CAREFULLY AND THEN INDICATE YOUR AGREEMENT OR DISAGREEMENT BY CIRCLING THE SYMBOL WHICH CORRESPONDS MOST CLOSELY TO YOUR OPINION REGARDING THAT STATEMENT. HERE IS WHAT THE SYMBOLS MEAN:

SD INDICATES YOU STRONGLY DISAGREE WITH THE STATEMENT.
D INDICATES YOU DISAGREE, BUT NOT STRONGLY.
N INDICATES YOU ARE NEUTRAL OR INDIFFERENT.
A INDICATES YOU AGREE, BUT NOT STRONGLY.
SA INDICATES YOU STRONGLY AGREE WITH THE STATEMENT.

Q-10 The physical design features (for example: lake size, shape and landscaping) of the Beaumaris Lake site encourage its use for the recreational activities which my household is interested in.................................. SD D N A SA

Q-11 The lake site is safe as an unsupervised recreation setting in this community .... SD D N A SA

Q-12 The regulations governing the recreational use of the lake site are too restrictive .... SD D N A SA

Q-13 The Beaumaris Lake site is usually clean and well maintained (for example: grass is kept trimmed, water and shoreline are usually free from debris) .... SD D N A SA

Q-14 The lake site is often too crowded to enjoy visiting it for recreational purposes .... SD D N A SA

Q-15 The use of the lake site by people who do not reside in the immediate area has been a problem .... SD D N A SA

Q-16 The lake site provides a relaxed neighborhood atmosphere where household members feel comfortable .... SD D N A SA

Q-17 The lake site provides the opportunity for individuals to enjoy and appreciate nature................................. SD D N A SA

Q-18 Views and scenery in this community are enhanced by the lake .... SD D N A SA

Q-19 The lake site is conveniently located for household members to visit for recreational purposes .... SD D N A SA

Q-20 The use of Beaumaris Lake for stormwater management deserves a higher priority than the use of the lake for recreation .... SD D N A SA

Q-21 Recreation activities which may involve accidental or temporary contact with the water (for example: canoeing) should be discouraged due to the overall water quality of Beaumaris Lake .... SD D N A SA

THE NEXT TWO QUESTIONS ARE DESIGNED TO IDENTIFY FURTHER REASONS FOR THE RECREATIONAL USE OR NON-USE OF THE LAKE SITE.

Q-22 Please indicate the degree to which you feel the following potential water quality problems occur at Beaumaris Lake. (CIRCLE THE SYMBOLS WHICH CORRESPOND MOST CLOSELY TO YOUR OPINION. SD = STRONGLY DISAGREE, D = DISAGREE, N = NEUTRAL, A = AGREE, SA = STRONGLY AGREE.)

(1)	Unpleasant odors	SD	D	N	A	SA
(2)	Scum or algae	SD	D	N	A	SA
(3)	Shore weeds	SD	D	N	A	SA
(4)	Lake weeds	SD	D	N	A	SA
(5)	Murky water	SD	D	N	A	SA
(6)	Chemical pollution	SD	D	N	A	SA
(7)	Other (PLEASE LIST)					
	______________________	SD	D	N	A	SA
	______________________	SD	D	N	A	SA
	______________________	SD	D	N	A	SA

Q-23 Please list any other factors which you feel are responsible for your household's recreational use or non-use of the lake site.

(1) ____

____

____

(2) ____

____

____

(3) ____

____

____

THIS SECTION IS INTENDED TO IDENTIFY HOW YOU FEEL IN GENERAL ABOUT THE BEAUMARIS LAKE SETTING. PLEASE INDICATE YOUR AGREEMENT OR DISAGREEMENT WITH THE FOLLOWING STATEMENTS BY CIRCLING THE APPROPRIATE NUMBER.

Q-24 I am generally satisfied with the recreational opportunities provided by the Beaumaris Lake site. (PLEASE CIRCLE ONE NUMBER.)

1 STRONGLY DISAGREE
2 DISAGREE
3 NEUTRAL
4 AGREE
5 STRONGLY AGREE

Q-25 I feel that Beaumaris Lake makes a positive contribution to the overall quality of the urban environment. (PLEASE CIRCLE ONE NUMBER.)

1 STRONGLY DISAGREE
2 DISAGREE
3 NEUTRAL
4 AGREE
5 STRONGLY AGREE

THIS LAST SECTION REQUESTS GENERAL INFORMATION ABOUT YOU AND THE MEMBERS OF YOUR HOUSEHOLD. YOUR ANSWERS WILL BE USED IN GROUPING RESPONSES FOR STATISTICAL PURPOSES WITH THOSE OF THE OTHER RESPONDENTS IN THE SURVEY. ALL ANSWERS WILL BE TREATED AS CONFIDENTIAL.

Q-26 In what year were you born? ________

Q-27 What is your sex? (CIRCLE ONE NUMBER.)

1 FEMALE
2 MALE

Q-28 Please indicate your highest level of formal education. (PLEASE CIRCLE ONE NUMBER.)

1 NO SCHOOLING
2 ELEMENTARY SCHOOL (up to grade six)
3 JUNIOR HIGH SCHOOL (up to grade nine)
4 PART OF SENIOR HIGH SCHOOL
5 COMPLETED SENIOR HIGH SCHOOL
6 PART OF A TECHNICAL OR VOCATIONAL PROGRAM
7 COMPLETED A TECHNICAL OR VOCATIONAL PROGRAM
8 SOME UNIVERSITY
9 UNIVERSITY DEGREE

Q-29 List the number of household members including yourself who fall within the following categories. (PLEASE WRITE IN THE SPACES PROVIDED.)

______ UNDER FIVE YEARS OF AGE
______ 5 TO 13
______ 14 TO 18
______ 19 TO 24
______ 25 TO 44
______ 45 TO 64
______ 65 AND OVER

Q-30 Do you own or rent your dwelling? (PLEASE CIRCLE ONE NUMBER.)

1 OWN
2 RENT

Q-31 How would you classify your dwelling unit? (CIRCLE ONE NUMBER.)

1 SINGLE FAMILY DETACHED DWELLING
2 OTHER (For example: Duplex, Row House)

Q-32 Approximately, what was the total amount of income that you and the members of your household earned before taxes in 1982? (CIRCLE ONE NUMBER.)

1 LESS THAN OR EQUAL TO $20,000
2 $20,001 TO $40,000
3 $40,001 TO $60,000
4 $60,001 TO $80,000
5 $80,001 TO $100,000
6 $100,001 AND OVER

THANK YOU FOR YOUR ASSISTANCE.

PLEASE USE THIS SPACE IF YOU HAVE ANY ADDITIONAL COMMENTS REGARDING BEAUMARIS LAKE OR THIS QUESTIONNAIRE.

....

Personal interviews will be conducted with up to 15 out of the approximately 450 Beaumaris Lake Community households. If selected, would you be willing to participate in these interviews? (CIRCLE ONE NUMBER.)

1 NO
2 YES

If yes, please provide your name and address below:

____

____

____

____

Appendix C

BEAUMARIS NEIGHBORHOOD RESIDENT QUESTIONNAIRE

COVERING LETTER

THE UNIVERSITY OF ALBERTA

FACULTY OF PHYSICAL EDUCATION
AND RECREATION

Department of Recreation Administration

EDMONTON, ALBERTA, CANADA T6G 2H9

TELEPHONE 432-5171

June 8, 1983

Dear Resident:

Your household has been chosen as part of a survey of all Beaumaris Lake Community residents. Individuals in this community are in the unique position of living by the first stormwater lake developed within Edmonton.

The current trend toward the development of urban stormwater lakes in new residential subdivisions is at least partially based on the belief that residents in these communities benefit from the lake setting. However, due to the relatively short history of these lakes, no one really knows how residents like yourself feel about living near to a stormwater lake. In order to obtain an accurate indication of your community's opinion of the Beaumaris Lake site, it is important that one of the household members who was involved in the original decision to locate in the neighborhood answer the accompanying questionnaire on behalf of your household.

You may be assured of complete confidentiality. The identification number on the questionnaire is intended to aid in the collection stage of the survey. Approximately five days after the questionnaire has been delivered one of the researchers will call on you to retrieve it. As each questionnaire is collected the identification number will be checked off to avoid further call backs to your residence.

The results of this research will be made available to officials in both city and provincial governments. In addition, the developers and consulting firms involved with Beaumaris Lake will be notified of the study results.

I would be most happy to answer any questions that you might have. Please write or call. I may be reached at the following telephone numbers: office: 432-2763 or residence: 437-7788.

Thank you for your assistance.

Sincerely,

Tom Hinch

Tom Hinch
Graduate Student

TH:dro

Appendix D

STUDY NOTICES USED DURING THE DATA COLLECTION PHASE

**** NOTICE ****

CONCERNING THE BEAUMARIS LAKE COMMUNITY SURVEY

The collection phase of this survey will occur this weekend and early next week. Please leave the completed questionnaire in your mailbox if that would be more convenient. Thank you for your help.

Tom Hinch
Department of Recreation Administration
University of Alberta

Dear Resident:

A final call back for the Beaumaris Lake questionnaire was made to your home this evening. Your input would still be appreciated. Please use the enclosed address label and postage if you are able to mail back the completed survey. Thank you for your cooperation.

Yours sincerely,

Tom Hinch

Appendix E

LIST OF PERSONAL INTERVIEWS

Bright, C. 1983. I.D. Engineering Co. (Edmonton).

Card, B. 1983. Director, Design Section, Edmonton Parks and Recreation (Edmonton).

Clark, H. 1983. Director, West District, Edmonton Parks and Recreation (Edmonton).

Dixon, J. 1983, 1984. Development Manager, Genstar Development Company (Edmonton).

Prasad, B. 1983. Supervisor, Parks Planning, Edmonton Parks and Recreation (Edmonton).

Spacek, O. 1983. West End Drainage, Edmonton Water and Sanitation (Edmonton).